



# New feather mites of the subfamily Pterodectinae (Acari: Astigmata: Proctophyllodidae) from passerines (Aves: Passeriformes) in Mato Grosso do Sul, Brazil

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## Abstract

Four new species of the genus *Pterodectes* Robin, 1877 and three new monotypic genera of the feather mite subfamily Pterodectinae (Astigmata: Proctophyllodidae) are described from various passerines captured in Mato Grosso do Sul (Brazil). The following new species are described: *Pterodectes paroariae* **sp. n.** from *Paroaria capitata* (Orbigny et Lafresnaye, 1837) (Emberizidae), *P. tangarae* **sp. n.** from *Tangara cayana* (Linnaeus, 1766) (Thraupidae), *P. molothrus* **sp. n.** from *Molothrus bonariensis* (Gmelin, 1789) (Icteridae), *P. pitangi* **sp. n.** from *Pitangus sulphuratus* (Linnaeus, 1766) (Tyrannidae), *Tyrannidectes berlai* gen. n., **sp. n.** from *Myiarchus tyrannulus* (Muller, 1776) (type host) and *M. ferox* (Gmelin, 1789) (Tyrannidae), *Metapterodectes furnarius* gen. n., **sp. n.** from *Furnarius rufus* (Gmelin, 1788) (Furnariidae), and *Nanodectes formicivorae* gen. n., **sp. n.** from *Formicivora rufa* (Thamnophilidae). Brief comments on the taxonomic structure of the subfamily Pterodectinae and species content of the genus *Pterodectes* are given. The two newly described genera, *Tyrannidectes* gen. n. and *Metapterodectes* gen. n., are close to the genus *Pterodectes*. The genus *Tyrannidectes* gen. n. differs from the latter genus by loss of setae *sR* on trochanters III, and *Metapterodectes* gen. n. differs by loss of setae *sR* on trochanters III and Solenidion  $\sigma 1$  on genua III. In *Pterodectes*, setae *sR*III and solenidion  $\sigma 1$  are present on legs III. The genus *Nanodectes* gen. n. is close to *Proterothrix* Gaud, 1968 and differs from that genus by the loss of idiosomal setae *d1*, *d2*, *e2*, *f2* that is a unique combination of lost setae among all pterodectines; in closely related *Proterothrix*, only idiosomal setae *c1* may be absent.

**Key words:** Acari, Astigmata, feather mites, Proctophyllodidae, systematics, Aves, Passeriformes, Brazil

## Introduction

Feather mites are diversiform and highly specialized grouping of astigmatan mites permanently dwelling on the plumage or skin of birds. These mites count about 2500 species, which according to modern taxonomic concepts constitute at least three separate superfamilies within the supercohort Psoroptidia (OConnor 1982; Gaud & Atyeo 1996; Dabert & Mironov 1999). The Pterodectinae is one of the three subfamilies of Proctophyllodidae (Astigmata: Analgoidea) currently including over 120 species in 13 genera (Park & Atyeo 1971; Gaud & Atyeo 1996; Mironov & Fain 2003; Hernandez & Valim 2006; Mironov 2006). Pterodectines are typical inhabitants of feathers with well developed and large vanes, such as the primary and secondary flight feathers and the tail feathers, where they are located in corridors on the ventral side of vanes. They are highly adapted to these microhabitats and commonly have a strongly elongated and slightly flattened body, with well developed dorsal shields and with most dorsal setae significantly reduced in size. Mites of this subfamily are widely distributed on passerines (Passeriformes) and hummingbirds (Apodiformes: Trochilidae), several species occur on the representatives of Piciformes and Coraciiformes, while host associations with Musophagiformes (Trouessart 1885) and Gruiformes (Aty eo & Gaud 1977) are exceptions and quite probably the results of host shifting.

Taxonomic biodiversity of pterodectines was most extensively studied in the past fifty years in Africa (Gaud 1952, 1953, 1957, 1964; Till 1954, 1957; Gaud & Mouchet 1957; Gaud & Till 1961; Mironov & Kopyj 1996a, 1996b, 1997; Mironov & Fain 2003) and South America (Berla 1958, 1959a–1959c, 1960; Černý 1974; OConnor *et al.* 2005; Hernandez & Valim 2005, 2006; Valim & Hernandez 2006). In much lesser extent these mites were explored in other areas of the Old World (Sugimoto 1941; Gaud & Petitot 1948, Gaud 1962, 1968, Mironov 1996, 2006; Kuroki *et al.* 2006; Mironov *et al.* 2008). A detailed revision of Pterodectinae, including renewed generic diagnoses, key to genera, and a review of their species content, was carried out by Park and Atyeo (1971). Nevertheless, the most species-rich genera of this subfamily, *Montesauria* Oudemans, 1905, *Pterodectes* Robin, 1877, and *Proterothrix* Park et Atyeo, 1971, need taxonomic revisions and construction of keys to species to stimulate subsequent investigation of these mites. Taking into consideration a great number of potential but yet unexplored passerine hosts of pterodectines, it is possible to expect a vast fauna, several times greater than what is currently known.

Nearly all pterodectines recorded so far from passerines in the New World were referred to the genus *Pterodectes* (18 species), and only one species, *Dolichodectes neotropicus* Hernandez et Valim, 2006, was described in the context of the genus *Dolichodectes* Park et Atyeo, 1971 (Park & Atyeo 1971; Černý 1974; OConnor *et al.* 2005; Hernandez & Valim 2005, 2006; Valim & Hernandez 2006). It is necessary to note that *D. neotropicus* actually does not fit in the genus *Dolichodectes*, is much closer to *Pterodectes*, and should probably be placed into a separate genus. In the present paper we describe four new species of the genus *Pterodectes* and three new monotypic genera of the subfamily Pterodectinae found on various passerines in the course of the investigation of ectoparasites associated with birds in Mato Grosso do Sul, Brazil.

## Material and methods

The material used in the present study was collected from birds in the state Mato Grosso do Sul (Brazil) in the period of July–August 2006. Birds were trapped by means of ornithological mist nets placed in fragmented habitats within the Cerrado biome, a kind of woodland savanna, which formerly dominated the Central Brazilian Plateau. Each individual bird was identified and examined visually for the presence of feather mites. A small part of a flight feather infested with feather mites was cut off with scissors and, using a tweezers, placed into a tube with 70% ethanol. After the processing, birds captured were released back into the wild as quickly as possible to minimize disturbance. Collected mite specimens were mounted on microslides in Faure medium according to standard technique (Evans 1992).

The descriptions of new taxa are given in the format used for species of pterodectine mites (Mironov & Fain 2003; Hernandez & Valim 2006; Mironov 2006). General morphological terms and leg and idiosomal chaetotaxy follow Gaud and Atyeo (1996). All measurements are in micrometres ( $\mu\text{m}$ ). Measuring techniques for particular structures:

(i) length of idiosoma is measured from the anterior margin to lobar apices (in males) and to the lobar apices excluding the terminal appendages (in females), width of idiosoma is measured at level of the humeral shields;

(ii) hysterosoma is measured from the level of sejugal furrow to bases of setae *h3*;

(iii) distance between different pairs of setae is the shortest distance between the transverse levels formed by setae of respective pairs;

(iv) prodorsal shield length is measured along the midline, and width is the greatest width at posterior margin;

(v) hysteronotal shield length in males is the greatest length from the anterior margin to bases of setae *h3*; width is measured at the anterior margin;

(vi) anterior hysteronotal shield length in females is the greatest length from the anterior margin to the transverse furrow separating this shield from the lobar shield; width is measured at the anterior margin;

(vii) length of the lobar region in females is the greatest length from its anterior margin to lobar apices (the terminal appendages are excluded), and width is measured at the level of the lateral extensions bearing setae *h2*.

Systematics and scientific names of birds follow Dickinson (2003). Type material depositories: ZISP—Zoological Institute of the Russian Academy of Sciences (Saint-Petersburg, Russia), PaU—Institute of Parasitology, Biology Centre ASCR, v. v. i. (Ceské Budejovice, Czech Republic).

## Taxonomy

### Family Proctophyllodidae Trouessart et Mégnin, 1884

#### Subfamily Pterodectinae Park et Atyeo, 1971

In the generic revision of Pterodectinae, Park and Atyeo (1971) arranged its genera into the *Pterodectes* and *Trochilodectes* generic groups based on the following characteristics. In the *Pterodectes* group (8 genera), solenidion Solenidion  $\sigma 1$  on genua I is noticeably shorter than solenidion  $\omega 3$  on tarsi I, and tarsal seta *wa* is situated distinctly anterior to setae *ra*, *la* on tarsi I, II. In the *Trochilodectes* group (5 genera), solenidion Solenidion  $\sigma 1$  is subequal or longer than solenidion  $\omega 3$  on legs I, and tarsal setae *ra*, *wa*, *la* are approximate to each other and situated at the midlevel of tarsi I, II. Further, one more genus, *Alaudicola* Mironov, 1996, was established within the *Pterodectes* group (Mironov, 1996), and the genus *Sclerodectes* Park et Atyeo, 1973, originally referred to the *Trochilodectes* group, was moved to the subfamily Rhamphocaulinae (Proctophyllodidae) (Park & Atyeo, 1973; Gaud & Atyeo, 1996). Mites of the *Trochilodectes* group are restricted to hummingbirds (Apodiformes: Trochilidae), while representatives of the *Pterodectes* group occur on birds from other host orders.

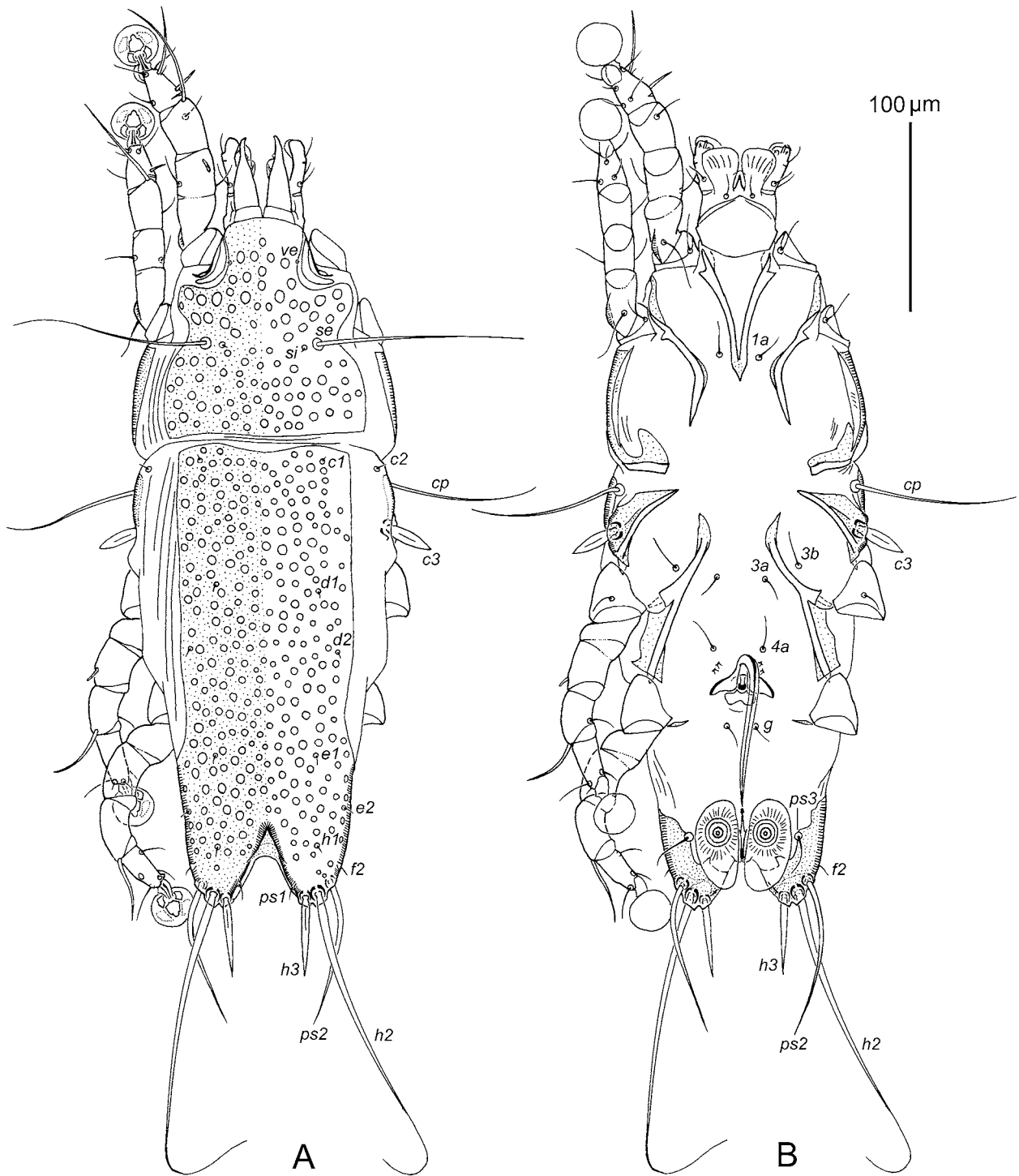
#### Genus *Pterodectes* Robin, 1877

Until the beginning of 1970s, the genus *Pterodectes* accumulated almost all pterodectine species in recent sense. When Park and Atyeo (1971) established a new subfamily, Pterodectinae, and arranged nearly one hundred of “*Pterodectes*” species known up to that time into 12 genera, the species content of the genus *Pterodectes* was reduced to nine species. After this revision, ten more species have been described in the context of *Pterodectes* (Černý 1974; Atyeo & Gaud 1977; OConnor *et al.* 2005; Hernandez & Valim 2005, 2006). Representatives of this genus were recorded from passerines of eleven families: Cardinalidae, Corvidae, Cotingidae, Emberizidae, Furnariidae, Hirundinidae, Icteridae, Parulidae, Thraupidae, Troglodytidae, Turdidae, and Tyrannidae. All species associated with passerines, except for *Pterodectes rutilus* Robin, 1877 living generally on swallows of the genus *Hirundo* Linnaeus, 1858 (Hirundinidae), are known from the New World.

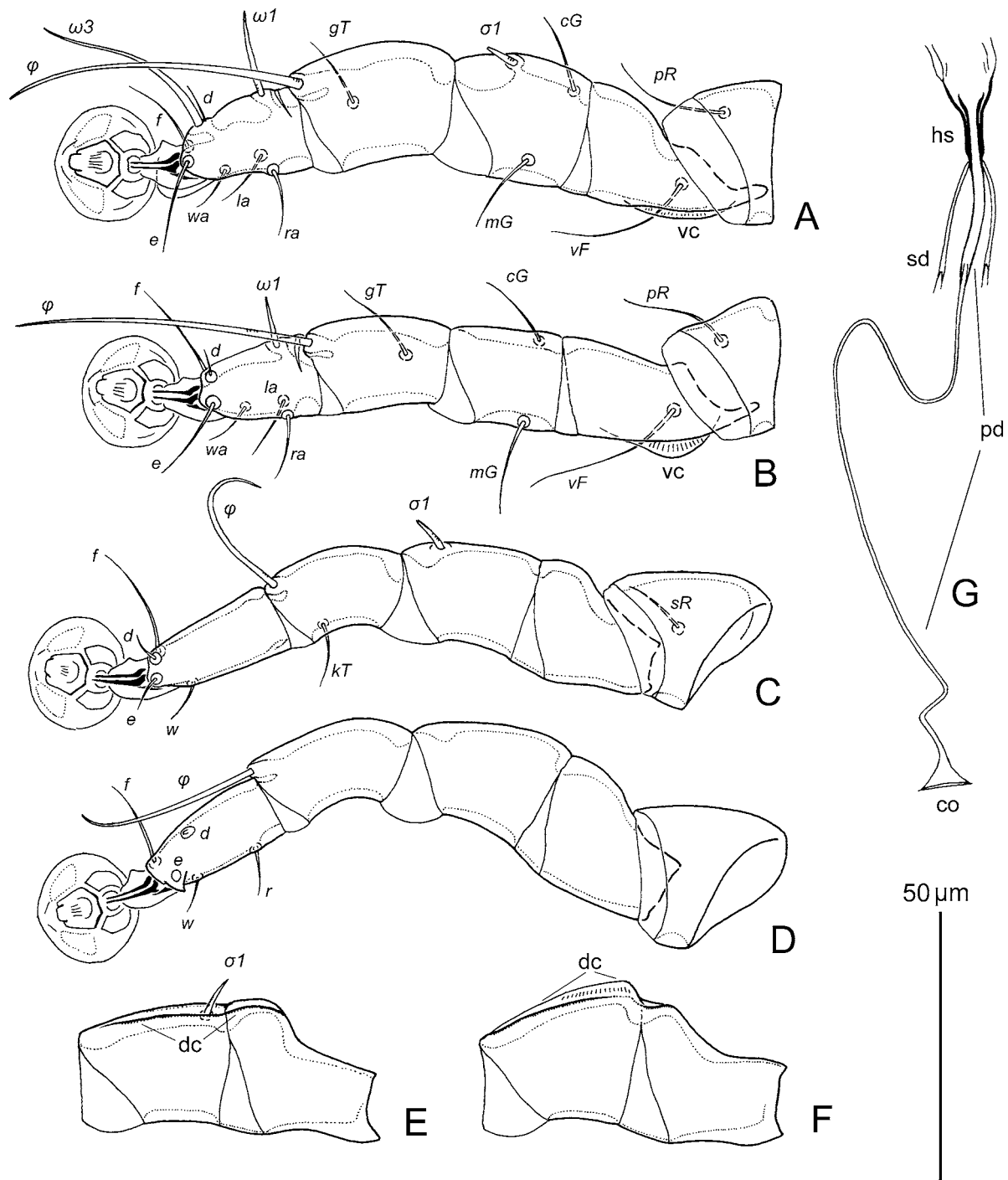
Regarding the species content of *Pterodectes*, it is necessary to point out that *P. ralliculae* Atyeo et Gaud, 1977, described from rails (Gruiformes: Rallidae) in New Guinea and provisionally placed by its authors in this genus, quite certainly does not belong to it. By the structure of the male genital apparatus (the posterior position of genital papillae relative to the genital arch), *P. ralliculae* is definitely much closer to the genus *Montesauria* Oudemans, 1905 than to *Pterodectes* and probably deserves to be placed in a separate genus. Besides, *P. interifolia* Trouessart, 1899, described from *Rupicola peruviana* (Latham, 1790) (Passeriformes: Cotingidae), also should be moved to a new genus (M. Valim and F. Hernandez, personal communication), because male specimens have quite unusual opisthosomal lobes for a typical *Pterodectes* species. Even excluding these two named species from the genus *Pterodectes*, host-associations of this genus with phylogenetically distant passerine families, belonging both to oscines and suboscines, retain some doubts that the genus *Pterodectes* in recent concept is monophyletic. Valim and Hernandez (2006) redescribed most *Pterodectes* species described by Berla (1958, 1959a, 1959c, 1960), nevertheless all other pterodectine species described by other authors before the 1980s (Trouessart 1885; Stoll 1893; Banks 1909; Černý 1974) need a redescription and confirmation of their systematic position within the Pterodectinae.

***Pterodectes paroariae* Mironov sp. n.**  
(Figs. 1–3)

Type material. Male holotype (ZISP 4372), 3 male and 6 female paratypes ex *Paroaria capitata* (Orbigny et Lafresnaye, 1837) (Emberizidae), Brazil, Mato Grosso do Sul, Fazenda Belcanto near Ivinhema River, 22° 31' S, 53° 30' W, 12 August 2006, I. Literak. Holotype, 1 male and 4 female paratypes (ZISP 4374-4376) – ZISP, remaining paratypes – PaU.



**FIGURE 1.** *Pterodectes paroariae* sp. n., male. A—dorsal view, B—ventral view.



**FIGURE 2.** *Pterodectes paroariae* sp. n., details. A—leg I of male, B—leg II of male, C—leg III of male, D—leg IV of male, E—femoragenu III of female, F—femoragenu IV of female, G—spermatheca and spermaducts. dc—dorsal crest, co—copulatory opening, hs—head of spermatheca, pd—primary spermaduct, sd—secondary spermaduct, vc—ventral crest.

**Male** (holotype, measurements for 3 paratypes in parenthesis). Idiosoma, length  $\times$  width, 361 (355–388)  $\times$  145 (145–165), length of hysterosoma 235 (235–250). Prodorsal shield: 115 (110–120)  $\times$  108 (105–115), lateral margins entire, posterior margin almost straight, antero-lateral extensions widely rounded, surface with numerous circular lacunae 3–7 in diameter; scapular setae *se* separated by 62 (60–68). Setae *ve* present.

Humeral shields narrow, situated laterally, separated from epimerites III. Setae *cp* situated on ventral margin of humeral shield. Setae *c2* situated on soft tegument, near anterior end of humeral shield. Subhumeral setae *c3* lanceolate, 25 (24–26) × 7 (7–9). Hysteronotal shield: greatest length 245 (240–260), width in anterior part 95 (95–100), anterior margin slightly concave, entire surface with numerous circular lacunae 5–10 in diameter. Distance between prodorsal and hysteronotal shields along midline 9 (9–15) (Fig. 1A). Opisthosomal lobes approximately as long as wide at base; posterior ends of lobes roughly rounded, with short and blunt extensions bearing bases of setae *h2* and *h3* and usually forming two teeth on lobar apices. Terminal cleft shaped as an inverted U with strongly divergent branches, 26 (26–30) in length. Supranal concavity present. Setae *f2* situated anterior to bases of setae *ps2*. Setae *h1* situated at level of posterior end supranal concavity. Setae *h3* narrowly lanceolate, 42 (42–50) × 3 (3–4); setae *ps2* 82 (80–90) long, slightly thickened; setae *ps1* minute, filiform, 6 (6–7) long, situated on margin of terminal cleft approximately at level of setae *ps2*. Distance between bases of dorsal setae: *se:c2* 79 (65–75), *c2:d2* 100 (95–105), *d2:e2* 84 (84–100), *e2:h3* 47 (45–58), *d1:d2* 56 (40–60), *e1:e2* 26 (25–30), *h1:ps2* 20 (20–30), *h2:h2* 60 (58–65), *h3:h3* 42 (40–48), *ps2:ps2* 69 (65–78).

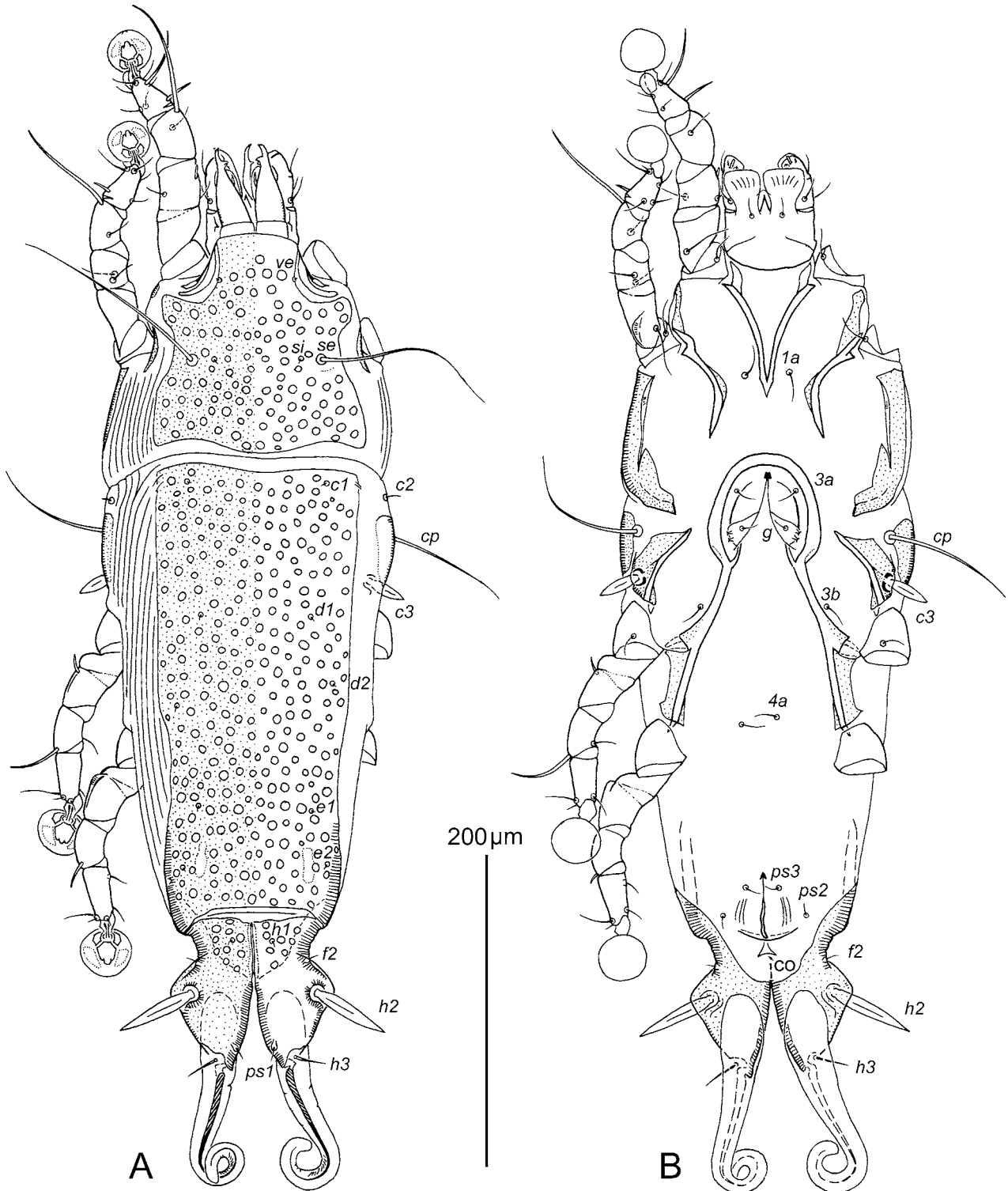
Epimerites I fused into a V, fused part with acute posterior end and without lateral extensions (Fig. 1B). Coxal fields I, II without extensive sclerotized areas. Rudimentary sclerite rEpIIa absent. Coxal fields II, III open. Coxal fields IV without sclerotized areas. Epimerites IVa rudimentary. Genital arch of moderate size, 22 (20–24) × 33 (33–35); basal sclerite of genital apparatus with concave posterior margin; aedeagus straight, sword-shaped, 82 (80–85) long, extending to anterior end of anal opening; genital papillae (acetabula of many authors) situated at level of genital arch apex. Genital and adanal shields absent. Anal suckers 14 (13–15) in diameter, corolla smooth. Opisthoventral shields wide, occupying postero-lateral half of lobes; inner margins of these shields with acute (tooth-like) extension at level of setae *f2* and with setae *ps3* at midlevel of anal suckers. Distance between ventral setae: *3b:3a* 5 (5–10), *3a:4a* 37 (35–45), *4a:g* 40 (40–45), *g:ps3* 60 (60–65), *ps3:ps3* 60 (60–65), *ps3:h3* 36 (35–38).

Femora I, II with ventral crests, other segments of legs I, II without processes. Solenidion Solenidion  $\sigma I$  of genu I short, 6 (5–9) long, situated at midlevel of segment; genual setae *cGI*, II, *mG* I, II setiform (Figs 2 A, B). Solenidion  $\sigma I$  of genu III in distal part of segment. Setae *d* of tarsi II, III shorter than corresponding setae *f*. Tarsus IV 23 (23–25) long, with small apical claw-like process; seta *d* as minute knob, situated at midlevel of segment; setae *e* as poorly sclerotized button, situated at base of apical claw; solenidion  $\phi$  of tibia IV extending to midlevel of ambulacral disc (Fig. 2 D).

**Female** (6 paratypes). Idiosoma, length × width, 535–545 × 180–190, length of hysterosoma 375–390. Prodorsal shield: general form and surface as in male except for slightly convex posterior margin, 140–145 × 130–140, setae *se* separated by 80–85. Setae *ve* present. Humeral shields narrow, situated laterally, separated from epimerites III. Setae *cp* situated on ventral margin of humeral shield. Setae *c2* situated on soft tegument, anterior to humeral shields. Setae *c3* lanceolate, 24–26 × 7–8. Distance between prodorsal and hysteronotal shields along midline 10–15. Anterior and lobar parts of hysteronotal shield separated dorsally by narrow transverse band of soft tegument, but remain connected ventro-laterally (Fig. 3 A). Anterior hysteronotal shields almost rectangular, anterior margin slightly concave, greatest length 285–295, width at anterior margin 120–130, whole surface with numerous circular lacunae as in prodorsal shield. Length of lobar region 95–100, greatest width 93–105. Terminal cleft as narrow V, extending to level of setae *h2*, 55–60 long, distance between lobar apices 25–35. Setae *h1* on lobar shield, distant from anterior margins; setae *h1* and *f2* in trapezoid arrangement. Setae *h2* spindle-like, 50–55 × 7–9. Setae *ps1* near to inner margins of opisthosomal lobes. Setae *h3* 20–25 long, about 1/6 of terminal appendages. Distance between dorsal setae: *se:c2* 85–105, *c2:d2* 110–125, *d2:e2* 110–120, *e2:h2* 75–80, *h2:h3* 40–45, *d1:d2* 35–45, *e1:e2* 32–40, *h1:h2* 34–40, *h1:h1* 22–28, *h2:h2* 72–85, *h3:h3* 40–50.

Epimerites I fused into a V; fused part with acute posterior tip, without lateral extensions. Lateral parts of coxal fields I, II without large sclerotized areas (Fig. 3 B). Epimerites IVa absent. Translobar apodemes of

opisthosomal lobes present, not fused to each other anterior to terminal cleft. Epigynum horseshoe-shaped, without lateral extensions, greatest width 68–75. Pseudanal setae setiform, setae *ps2* approximately at midlevel of anal opening, distance between setae: *ps2:ps2* 50–55, *ps3:ps3* 22–25, *ps2:ps3* 18–22. Head of spermatheca long and narrow, primary spermaduct with short enlargement (about 15 long) in proximal part; secondary spermaducts approximately equal in length to enlargement of primary spermaduct; copulatory opening ventral, slightly posterior to anal opening (Fig. 3 B).



**FIGURE 3.** *Pterodectes paroariae* sp. n., female. A—dorsal view, B—ventral view. co—copulatory opening.



Femur I without crest, femur II with ventral crest, other segments of these legs as in male. Solenidion  $\sigma I$  of genu I short, 7–9 long, situated at midlevel of segment. Genual setae  $cGI$ , II,  $mG$  I, II setiform. Setae  $d$  of tarsi II–IV shorter than corresponding setae  $f$ . Genu IV dorsally inflated, with wide longitudinal dorsal crest, genu III with low longitudinal dorsal crest (Figs 2 E, F).

**Differential diagnosis.** Among formerly described species, *Pterodectes paroariae* sp. n. is most similar to *P. atyeoi* OConnor, Foufopoulos et Lipton, 2005 from *Geospiza fuliginosa* Gould, 1837 (Emberizidae) by having extensive ventral sclerotization of opisthosomal lobes and relatively short and narrowly lanceolate setae  $h3$  in males (Fig. 1 B). *Pterodectes paroariae* differs from that species by the following characters: in both sexes, the entire surface of hysteronotal shield is covered with numerous large circular lacunae; in males, the fused part of epimerites I with acute tip, rudimentary sclerites rEpIIa are absent, epimerites IVa are rudimentary, and setae  $ps3$  are situated on inner margins of opisthoventral sclerites. In males of *P. atyeoi*, lacunae are little pit-like and occupy only the posterior third of hysteronotal shield, the fused part of epimerites I has a pair of short and acute lateral extension, rudimentary sclerites rEpIIa are present, and epimerites IVa are large and their inner ends touch the tips of genital arch, setae  $ps3$  are situated on soft tegument; in females, the anterior hysteronotal shields bears little pit-like lacunae only in postero-lateral parts.

**Etymology.** The specific epithet derives from the generic name of the host and is a noun in the genitive case.

#### ***Pterodectes tangarae* Mironov sp. n.**

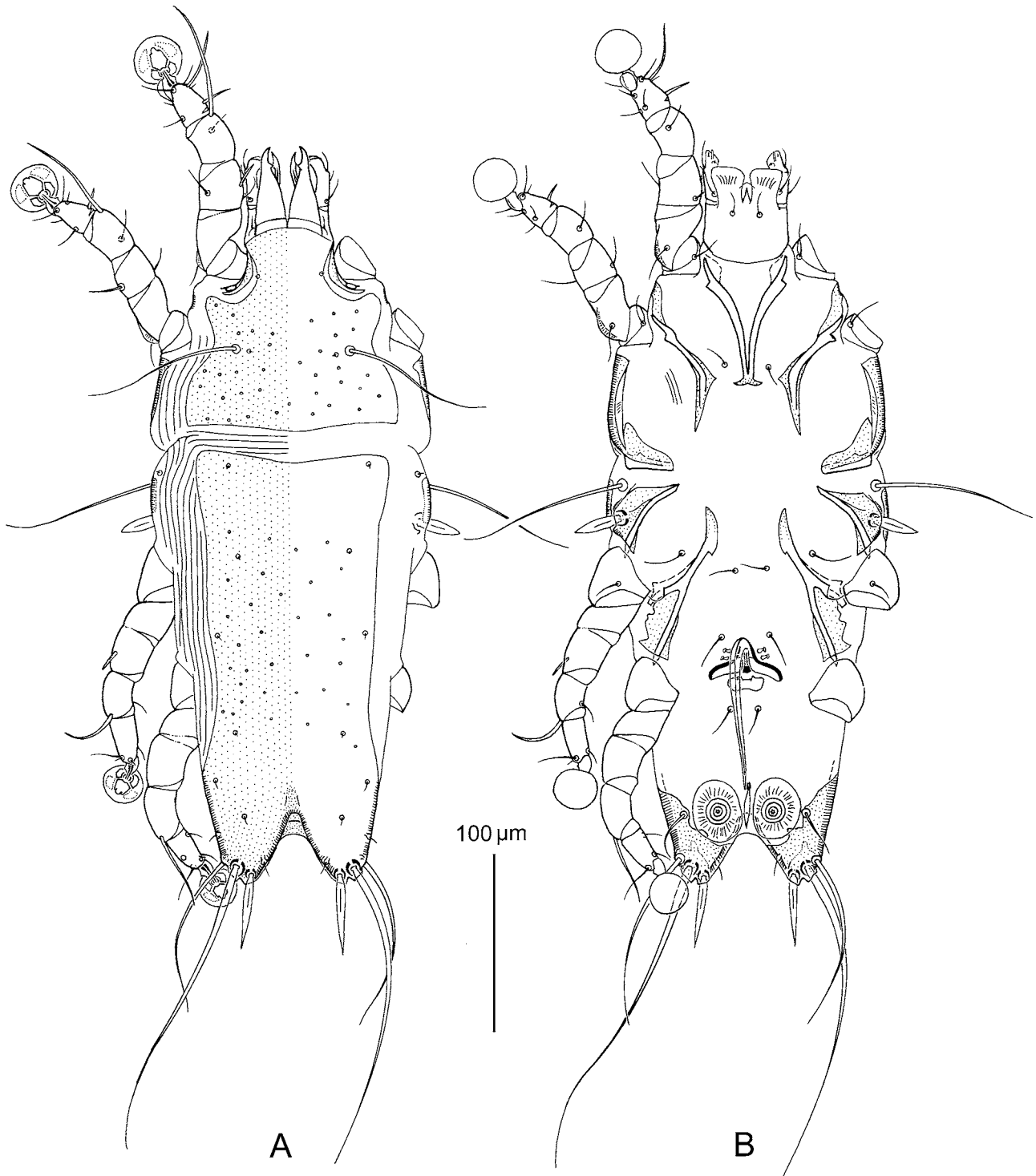
(Figs. 4–6)

Type material. Male holotype (ZISP 4377), 7 male and 3 female paratypes ex *Tangara cayana* (Linnaeus, 1766) (Thraupidae), Brazil, Mato Grosso do Sul, Nova Andradina, 22° 15' S, 53° 21' W, 17 July, 2006, I. Litterak and M. Čapek. Holotype, 3 male and 1 female paratypes (ZISP 4377 - 4381) – ZISP, remaining paratypes – PaU.

**Male** (holotype, measurements for 7 paratypes in parenthesis). Idiosoma, length  $\times$  width, 360 (360–375), 160 (150–165), length of hysterosoma 230–240. Prodorsal shield: 115 (115–120)  $\times$  118 (115–120), lateral margins entire, posterior margin slightly convex, antero-lateral extensions rounded, posterior 2/3 of surface with sparse, little pit-like lacunae; scapular setae  $se$  separated by 64 (55–65) (Fig. 4A). Setae  $ve$  present. Humeral shields narrow, situated laterally, separated from epimerites III. Setae  $cp$  situated on soft tegument, mesal from ventral margin of humeral shields. Setae  $c2$  situated on soft tegument, slightly anterior to humeral shields. Subhumeral setae  $c3$  lanceolate, 26 (25–28)  $\times$  7 (7–8). Hysteronotal shield: greatest length 236 (235–245), width in anterior part 110 (105–115), anterior margin slightly concave, middle part of shield with sparse little pit-like lacunae. Distance between prodorsal and hysteronotal shields along midline 17 (13–20). Opisthosomal lobes approximately as long as wide at base; posterior ends of lobes roughly rounded, with short and blunt extensions bearing bases of setae  $h2$  and  $h3$  and usually forming two teeth on lobar apices. Terminal cleft as an inverted U with widely divergent branches, 51 (44–51) in length. Supranal concavity present. Setae  $f2$  situated anterior to bases of  $ps2$ . Setae  $h1$  situated at level of supranal concavity. Setae  $h3$  narrowly lanceolate, 42 (40–45)  $\times$  3.5 (3–4); setae  $ps2$  93 (85–95) long; setae  $ps1$  minute, filiform, 7 (6–7) long, situated on margins of terminal cleft, approximately at level of setae  $ps2$ . Distance between dorsal setae:  $se:c2$  70 (70–75),  $c2:d2$  90 (85–95),  $d2:e2$  84 (80–90),  $e2:h3$  50 (45–55),  $d1:d2$  44 (40–45),  $e1:e2$  26 (25–35),  $h1:ps2$  24 (20–25),  $h2:h2$  66 (60–70),  $h3:h3$  50 (45–52),  $ps2:ps2$  78 (70–80).

Epimerites I fused into a V, fused part with short and acute lateral extensions (Fig. 4 B). Coxal fields I, II without extensive sclerotized areas; inner margin of epimerites II with short acute extension. Rudimentary sclerites rEpIIa absent. Coxal fields II, III open. Epimerites IVa absent. Genital arch of moderate size, 20 (18–22)  $\times$  40 (40–42); basal sclerite of genital apparatus with concave posterior margin; aedeagus straight, sword-

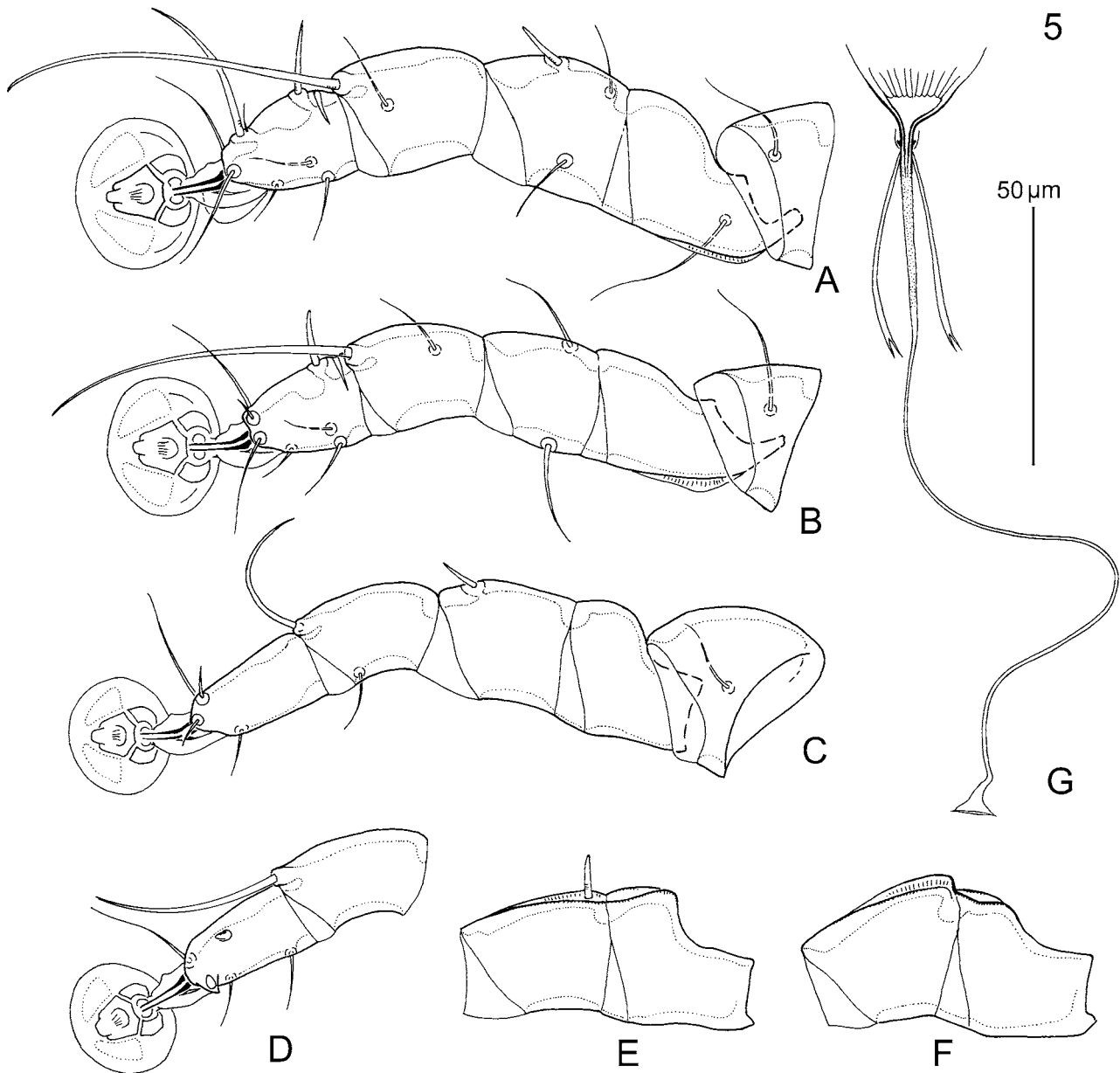
shaped, 82 (80–85) long, extending to anterior end of anal opening. Genital papillae at level of genital arch apex. Genital and adanal shields absent. Anal suckers 15 (14–15) in diameter, corolla smooth. Opisthoventral shields wide, occupy postero-lateral half of lobes; inner margins of these shields with tooth-like extension at level of setae *f2* and with setae *ps3* at midlevel of anal suckers. Distance between ventral setae: *3b:3a* 10 (5–11), *3a:4a* 40 (35–42), *4a:g* 38 (35–40), *g:ps3* 60 (55–60), *ps3:ps3* 65 (60–66), *ps3:h3* 33 (30–38).



**FIGURE 4.** *Pterodectes tangarae* sp. n., male. A—dorsal view, B—ventral view.

Femora I, II with narrow ventral crests, other segments of legs I, II without processes. Solenidium  $\sigma 1$  of genu I short, stick-like, 11 (10–12) long, situated at midlevel of segment; genual setae *cGI*, II, *mG* I, II seti-

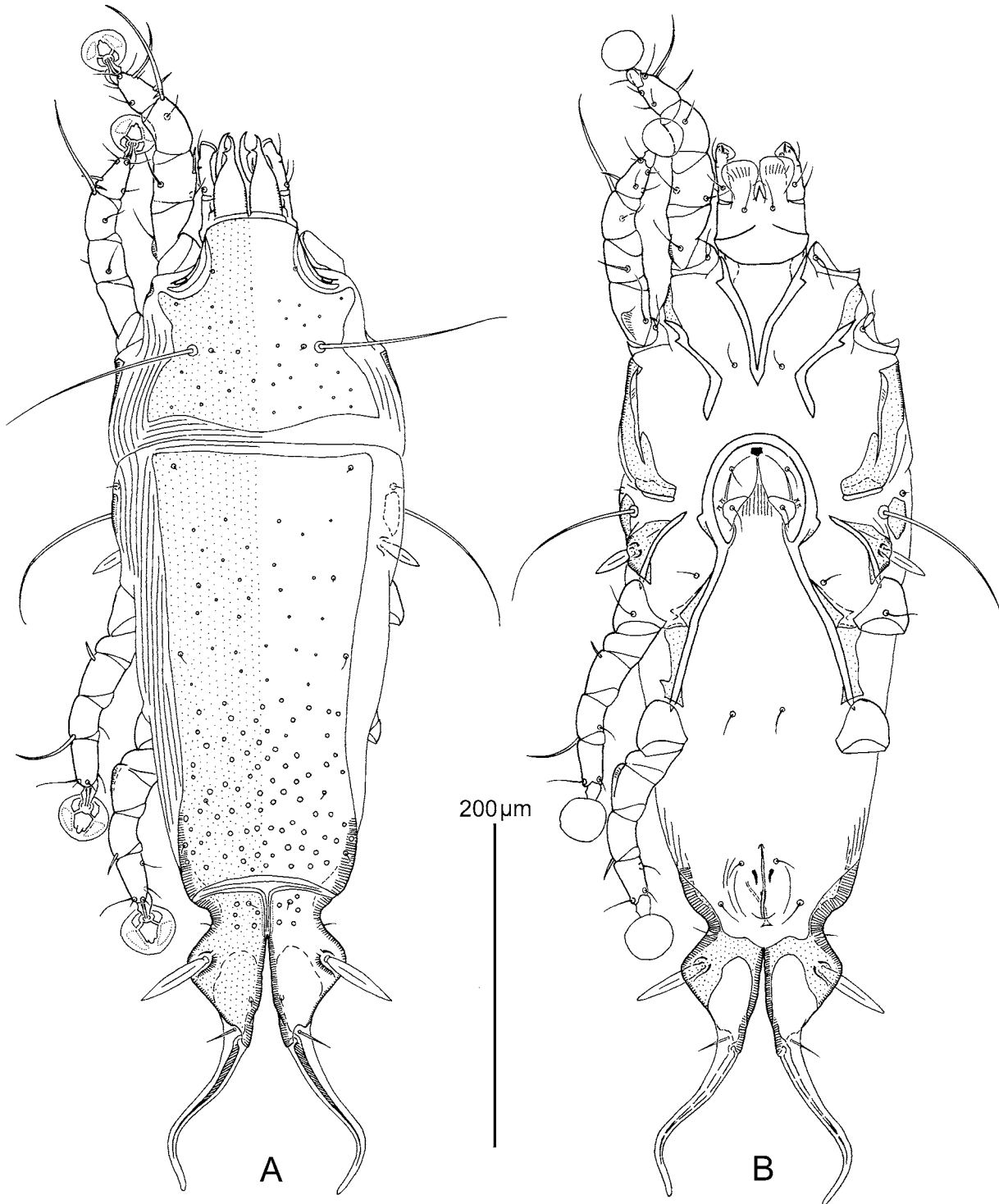
form (Figs 5 A, B). Solenidion  $\sigma 1$  of genu III in distal part of segment. Setae  $d$  of tarsi II, III shorter than corresponding setae  $f$ . Tarsus IV 24 (22–25) long, with small apical claw-like process; seta  $d$  minute, stick-like, situated slightly closer to apex than base of segment; seta  $e$  button-like, situated at base of apical claw; solenidion  $\phi$  of tibia IV extending to midlevel of ambulacral disc (Fig. 4 D).



**FIGURE 5.** *Pterodectes tangarae* sp. n., details. A—leg I of male, B—leg II of male, C—leg III of male, D—tarsus and tibia IV of male, E—femoragenu III of female, F—femoragenu IV of female, G—spermatheca and spermaducts.

**Female** (2 paratypes). Idiosoma, length  $\times$  width, 515–530  $\times$  180–195, length of hysterosoma 355–370. Prodorsal shield: general form as in male, 130–135  $\times$  135–145, setae  $se$  separated by 75–80 (Fig. 6 A). Setae  $ve$  present. Humeral shields narrow, separated from epimerites III. Setae  $cp$  situated on soft tegument near ventral margin of humeral shields. Setae  $c2$  situated near to anterior ends of humeral shields. Setae  $c3$  lanceolate, 28–32  $\times$  7–9. Distance between prodorsal and hysteronotal shields 15–20. Anterior and lobar pieces of hysteronotal shield separated dorsally by narrow transverse band of soft tegument, but remain connected

ventro-laterally (Fig. 6 B). Anterior hysteronotal shield: slightly enlarged in anterior part, anterior margin almost straight, greatest length 275–280, width at anterior margin 130–145, anterior half of shield with little pit-like lacunae, posterior half with circular lacunae about 5 in diameter. Length of lobar region 95–105, greatest width 95–102, anterior part with circular lacunae. Lobar shield split into two halves by narrow median furrow. Terminal cleft as a narrow inverted V, 65–75 long, distance between lobar apices 22–30. Setae *h1* on lobar shield, distant from anterior margins; setae *h1* and *f2* in trapezoid arrangement. Setae *h2* spindle-like,



**FIGURE 6.** *Pterodectes tangarae* sp. n., female. A—dorsal view, B—ventral view.

45–55 × 7–9. Setae *ps1* near to inner margins of opisthosomal lobes. Setae *h3* 20–28 long, about 1/6 of terminal appendages. Distance between dorsal setae: *se:c2* 84–95, *c2:d2* 110–115, *d2:e2* 125–130, *e2:h2* 60–70, *h2:h3* 40–50, *d1:d2* 35–50, *e1:e2* 30–45, *h1:h2* 35–40, *h1:h1* 25–30, *h2:h2* 75–80, *h3:h3* 40–50.

Epimerites I fused into a V, fused par with acute posterior end and without lateral extension. Lateral parts of coxal fields I, II without extensive sclerotized areas (Fig. 6 B). Epimerites IVa absent. Translobar apodemes of opisthosomal lobes present, not fused to each other anterior to terminal cleft. Epigynum with short lateral extensions, greatest width 70–75. Pseudanal setae setiform, distance between setae: *ps2:ps2* 50–58, *ps3:ps3* 20–30, *ps2:ps3* 20–28. Head of spermatheca as in Fig. 5 G; primary spermaduct with long but poorly expressed enlargement (about 30 long) in proximal part; secondary spermaducts slightly longer than enlargement of primary spermaduct, 30–35 long; copulatory opening ventral, slightly posterior to anus.

Legs I, II as in male. Solenidion  $\sigma 1$  of genu I thin stick-like, 13–17 long; genual setae *cGI*, II *mGI*, II setiform. Setae *d* of tarsi II–IV shorter than corresponding setae *f*. Genu IV dorsally inflated, with wide longitudinal dorsal crest, genu III with low longitudinal dorsal crest (Figs. 6 E, F).

**Differential diagnosis.** Like *P. paroariae* sp. n., *P. tangarae* sp. n. is most similar to *P. ateyoi* by having extensive ventral sclerotization of opisthosomal lobes and narrowly lanceolate setae *h3* in males (Fig. 4 B) and differs from the latter species by the characters as follows. In males of *P. tangarae*, little pit-like lacunae occupy the central part of hysteronotal shield, the anterior margin of the hysteronotal shield is slightly concave, and epimerites IVa are absent; in females, the humeral shields are present, the anterior hysteronotal and lobar shields are connected ventro-laterally (Fig. 6 B). In males of *P. ateyoi*, little pit-like lacunae of hysteronotal shield are generally present in its posterior third, the anterior margin of hysteronotal shield is straight, epimerites IVa are large and their inner ends touch the tips of genital arch; in females, the humeral shields are absent, anterior and lobar hysteronotal shields are completely separated.

**Etymology.** The specific epithet derives from the generic name of the host and is a noun in the genitive case.

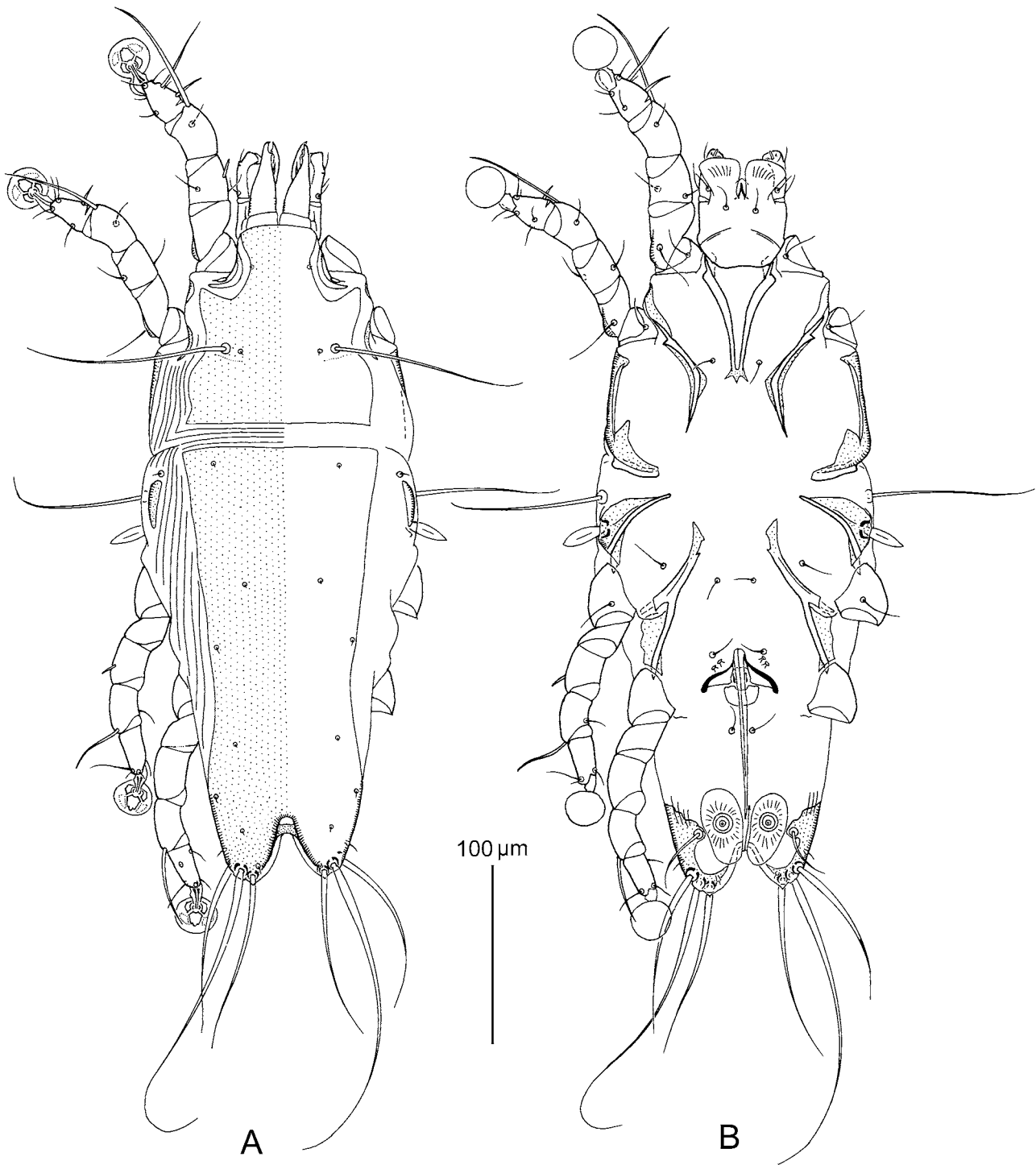
### ***Pterodectes molothrus* Mironov sp. n.**

(Figs. 7–9)

Type material. Male holotype (ZISP 4382), 4 male and 2 female paratypes ex *Molothrus bonariensis* (Gmelin, 1789) (Icteridae), Brazil, Pantanal, Fazenda Monte Alegre, 21°30'S, 56°40'W, 20 July 2006, I. Literak and M. Čapek. Holotype, 2 male and 1 female paratypes (ZISP 4382–4385) – ZISP, remaining paratypes – PaU.

**Male** (holotype, measurements for 4 paratypes in parenthesis). Length of idiosoma 365 (345–365), width 153 (144–155), length of hysterosoma 218 (215–240). Prodorsal shield: 110 (105–112) × 102 (100–105), lateral margins entire, posterior margin straight, antero-lateral extensions attenuate, rounded on ends, surface uniformly punctate; scapular setae *se* separated by 60 (58–65) (Fig. 7 A). Setae *ve* present. Scapular shields dorsally not developed. Humeral shields narrow, situated dorsally, separated from epimerites III. Setae *cp* situated laterally on soft tegument. Setae *c2* situated on soft tegument anterior to humeral shield. Subhumeral setae *c3* lanceolate, 22 (20–25) × 7 (7–8). Hysteronotal shield: greatest length 238 (230–240), width in anterior part 110 (102–110), anterior margin straight, surface uniformly punctate, without lacunae. Distance between prodorsal and hysteronotal shields along midline 13 (10–15) (Fig. 1A). Opisthosomal lobes as long as wide at base; posterior ends of lobes roughly rounded; setae *h2* and *h3* situated on posterior margin of lobes. Terminal cleft as an inverted U with divergent branches, 24 (22–25) in length; lateral margins of cleft with narrow interlobar membranes forming short tooth at base of setae *h3*. Supranal concavity present. Setae *f2* situated anterior to bases of setae *ps2*. Setae *h1* situated at level of supranal concavity. Setae *h3* large setiform, 78 (64–80) long; setae *ps2* 80 (80–85) long; setae *ps1* minute filiform, about 5 long, situated on margins of terminal cleft at levels of setae *h2*. Distance between dorsal setae: *se:c2* 70 (64–75), *c2:d2* 97 (90–100),

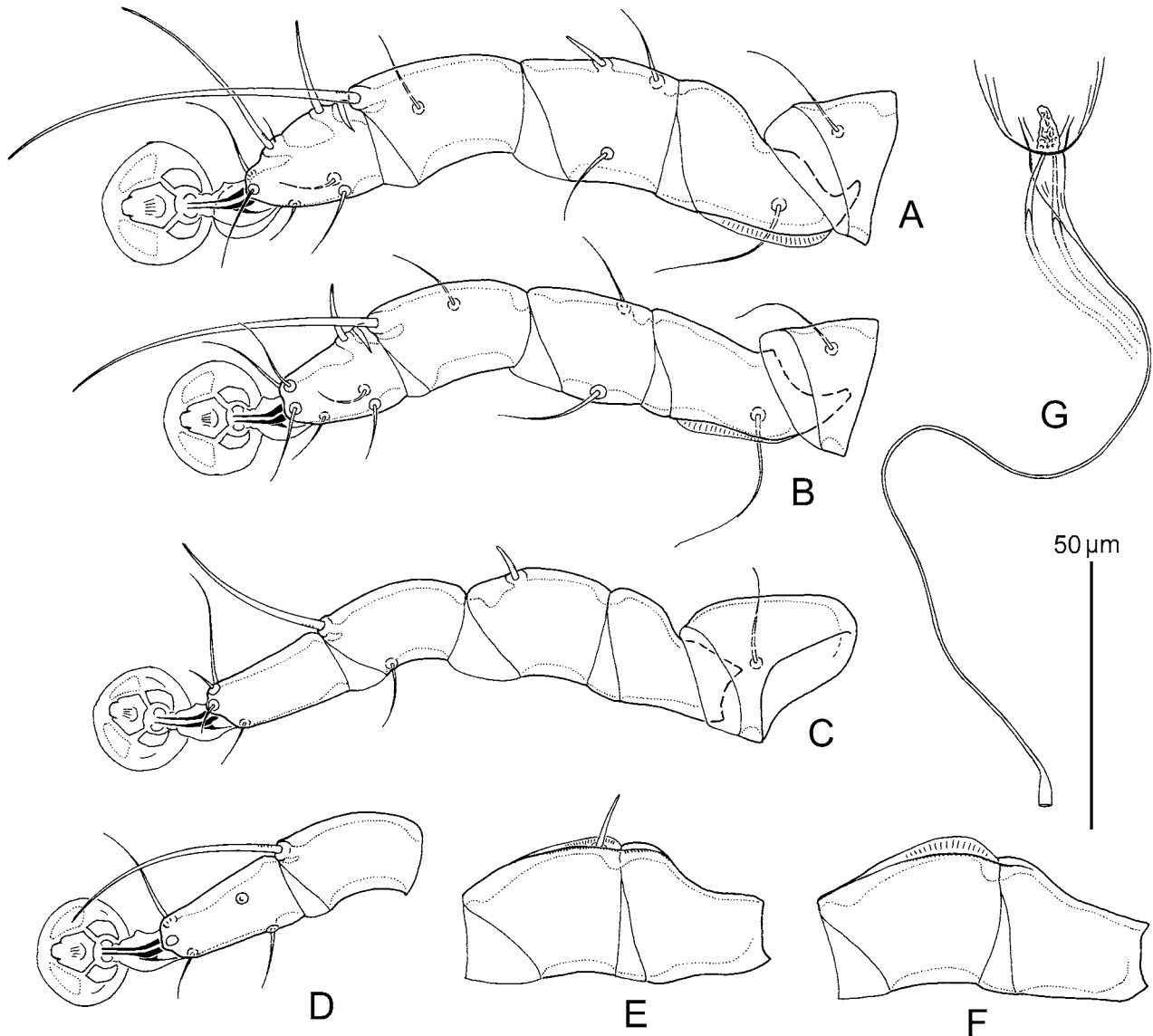
*d2:e2* 86 (80–90), *e2:h3* 44 (40–45), *d1:d2* 37 (30–40), *e1:e2* 31 (28–35), *h1:ps2* 16 (15–17), *h2:h2* 51 (50–55), *h3:h3* 42 (40–45), *ps2:ps2* 62 (60–65).



**FIGURE 7.** *Pterodectes molothrus* sp. n., male. A—dorsal view, B—ventral view.

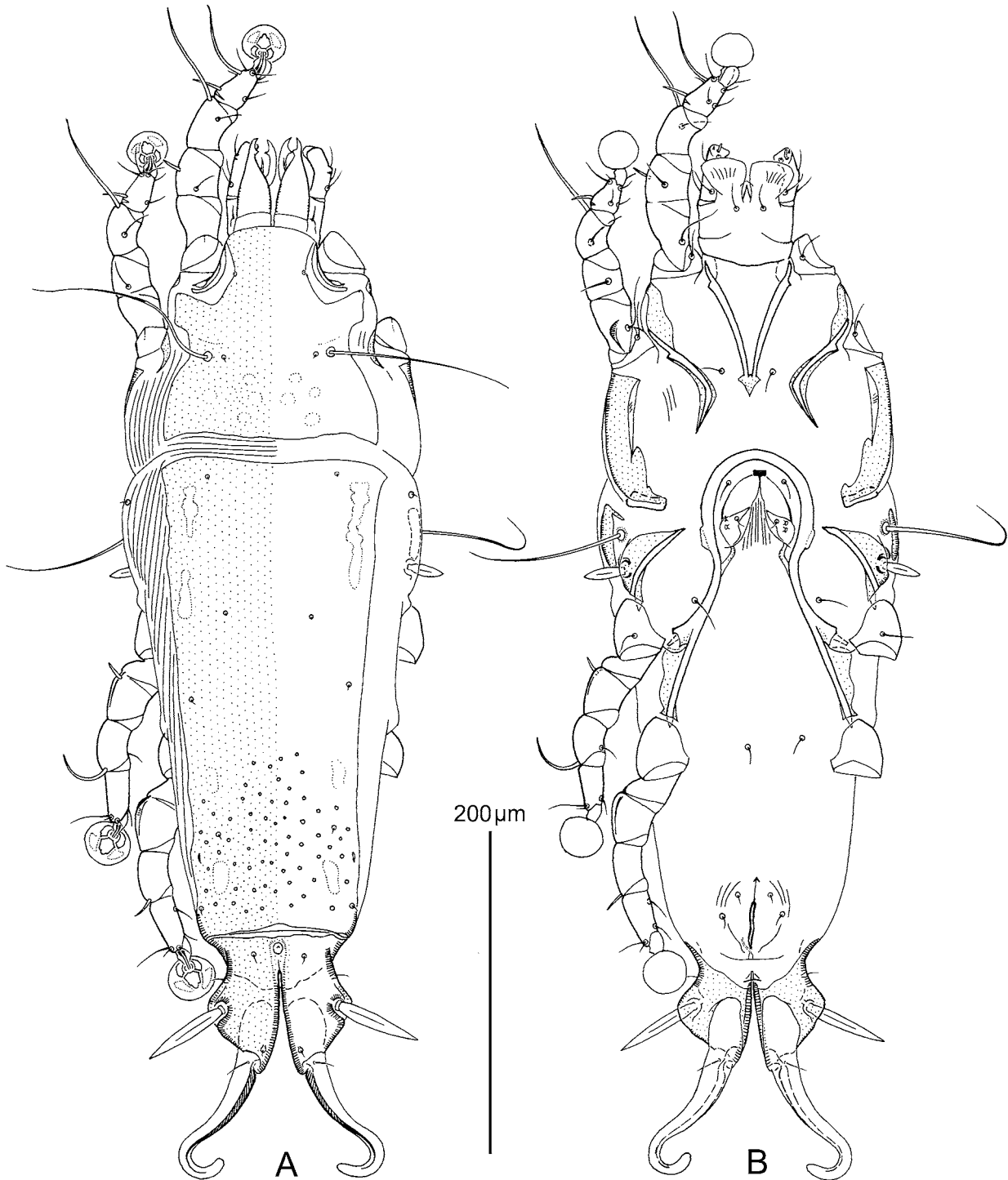
Epimerites I fused as a V, fused part tridentate (Fig. 7 B). Coxal fields I, II without large sclerotized areas. Rudimentary sclerite rEpIIa absent. Coxal fields II, III open. Coxal fields IV without sclerotized area. Epimerites IVa absent. Genital arch of moderate size, 24 (22–25) × 44 (40–44); basal sclerite of genital apparatus with semirounded posterior margin; aedeagus straight, sword-shaped, 95 (95–100) long, extending to anterior margin of anal suckers; genital papillae present, situated from each other. Genital and adanal shields absent.

Anal suckers 12 (12–13) in diameter, corolla smooth. Opisthoventral shields narrow, extending to lobar apices, inner margins at level of anal suckers with blunt extension, bearing setae *ps3*. Distance between ventral setae: *3b:3a* 9 (8–10), *3a:4a* 42 (35–42), *4a:g* 42 (35–44), *g:ps3* 55 (50–55), *ps3:ps3* 52 (52–55), *ps3:h3* 28 (24–30).



**FIGURE 8.** *Pterodectes molothrus* sp. n., details. A—leg I of male, B—leg II of male, C—leg III of male, D—tarsus and tibia IV of male, E—femoragenu III of female, F—femoragenu IV of female, G—spermatheca and spermaducts.

Legs I slightly thicker than legs II, femora I, II with narrow ventral crests, other segments of legs I, II without processes. Solenidion  $\sigma I$  of genu I short, stick-like, 9 (7–10) long, situated at midlevel of segment; genual setae *cGI*, II, *mGI*, II setiform, thin (Figs. 8 A, B). Legs III and IV similar in form and size. Solenidion  $\sigma I$  of genu III in distal part of segment. Seta *d* of tarsus II subequal to corresponding seta *f*, and seta *d* of tarsus III much shorter than corresponding setae *f*. Tarsus IV 24 (22–24) long, without apical claw-like process; setae *d*, *e* button-like, situated in basal half of segment and apically, respectively; solenidion  $\phi$  of tibia IV extending to midlevel of ambulacral disc (Fig. 2 D).



**FIGURE 9.** *Pterodectes molothrus* sp. n., female. A—dorsal view, B—ventral view.

**Female** (2 paratypes). Length of idiosoma 495–530, width 175–195, length of hysterosoma 355–375. Prodorsal shield: general form as in male, 130–135 × 130–140, posterior part with pale sclerotized rounded patches, setae *se* separated by 75–80 (Fig. 9 A). Setae *ve* present. Humeral shields present, narrow, situated ventrally. Setae *cp* situated on soft tegument, slightly mesal from ventral margin of humeral shields. Setae *c2* situated on soft tegument. Setae *c3* lanceolate, 22–24 × 7–8. Distance between prodorsal and hysteronotal shields 10–15. Anterior and lobar pieces of hysteronotal shield separated dorsally by narrow transverse band



of soft tegument, but remain connected ventro-laterally by narrow bands (Fig. 9 B). Anterior hysteronotal shield slightly enlarged in anterior part, anterior margin straight, greatest length 274–300, width at anterior margin 125–145, surface usually with four pairs of pale sclerotized areas near lateral margin of this shield. Length of lobar region 82–86, greatest width 84–90. Terminal cleft as a narrow inverted V, 60–66 long, distance between lobar apices 25–30. Setae *h1* on lobar shield, distant from anterior margins; setae *h1* and *f2* arranged in low trapezoid. Setae *h2* spindle-like, 52–55 × 7–9. Setae *ps1* near to inner margins of opisthosomal lobes. Setae *h3* short setiform, 13–15 long, about 1/8 of terminal appendages. Distance between dorsal setae: *se:c2* 78–90, *c2:d2* 120–125, *d2:e2* 135–145, *e2:h2* 60–64, *h2:h3* 35–40, *d1:d2* 42–60, *e1:e2* 42–48, *h1:h2* 30–35, *h1:h1* 28–32, *h2:h2* 65–75, *h3:h3* 40–45.

Epimerites I fused into a V, fused part with acute posterior end and short and acute lateral extension. Lateral parts of coxal fields I, II without large sclerotized areas. Epimerites IVa absent. Translobar apodemes of opisthosomal lobes present, wide, not fused to each other anterior to terminal cleft. Epigynum horseshoe-shaped, with short lateral extensions, greatest width 65–72. Primary spermaduct with ampuliform enlargement in proximal part from, outer surface of spermaduct smooth; secondary spermaducts 15–20 long (Fig. 8 G); copulatory opening situated ventral, near to anterior end of terminal cleft. Pseudanal setae *ps2*, *ps3* setiform, setae *ps2* situated at midlevel of anal opening, distance between setae: *ps2:ps2* 35–40, *ps3:ps3* 16–22, *ps2:ps3* 13–17.

Three distal segments of legs I, II as in male, femur I without ventral crest, femur II with ventral crest. Solenidion  $\sigma 1$  of genu I thin stick-like, 10–12 long. Genual setae *cGI*, II, *mG* I, II setiform, thin. Seta *d* of tarsus II subequal to corresponding seta *f*, and setae *d* of tarsi III, IV much shorter than corresponding setae *f*. Genu IV dorsally inflated, with wide longitudinal dorsal crest, genu III with low longitudinal crest (Figs 8 E, F).

**Differential diagnosis.** Among formerly known species, *Pterodectes molothrus* sp. n. seems to be most similar to *P. sialiarum* (Stoll, 1893) from *Sialia sialis* (Linnaeus, 1758) (Turdidae) by having the following characters: in both sexes, the humeral shields are small and situated laterally; in males, the fused part of epimerites I is tridentate, and setae *h3* are long setiform, comparable in length to setae *ps2*. *Pterodectes molothrus* differs from *P. sialiarum* by the following features: in males, the aedeagus extends to the anterior margin of the anal suckers, setae *ps3* are situated at the level of posterior margin of the anal suckers, and the interlobar membranes form a little tooth on lobar apices; in females, the terminal cleft is about ¾ of lobar shield length and extends distinctly beyond the level of setae *h2*, and the primary spermaduct has a strong ampuliform enlargement before the entering to spermatheca (Fig. 8 G). In males of *P. sialiarum*, the aedeagus extends to the posterior margin of anal suckers or to the anterior margin of terminal cleft, setae *ps3* are situated at the midlevel of the anal suckers, and the interlobar membrane is absent; in females, the terminal cleft extends to the level of setae *h2*, and the primary spermaduct has a poorly expressed enlargement, which is only twice wider than remaining part of the spermaduct.

**Etymology.** The specific epithet derives from the generic name of the host and is a noun in apposition.

### *Pterodectes pitangi* Mironov sp. n.

(Figs. 10–12)

Type material. Male holotype (ZISP 4395), 6 male and 4 female paratypes ex *Pitangus sulphuratus* (Linnaeus, 1766) (Tyrannidae), Brazil, Mato Grosso do Sul, Nova Andradina, 22° 15' S, 53° 21' W, 30 July 2006, I. Literak and M. Čapek. Holotype, 4 male and 2 female paratypes (ZISP 4395-4401) – ZISP, rest paratypes – PaU.

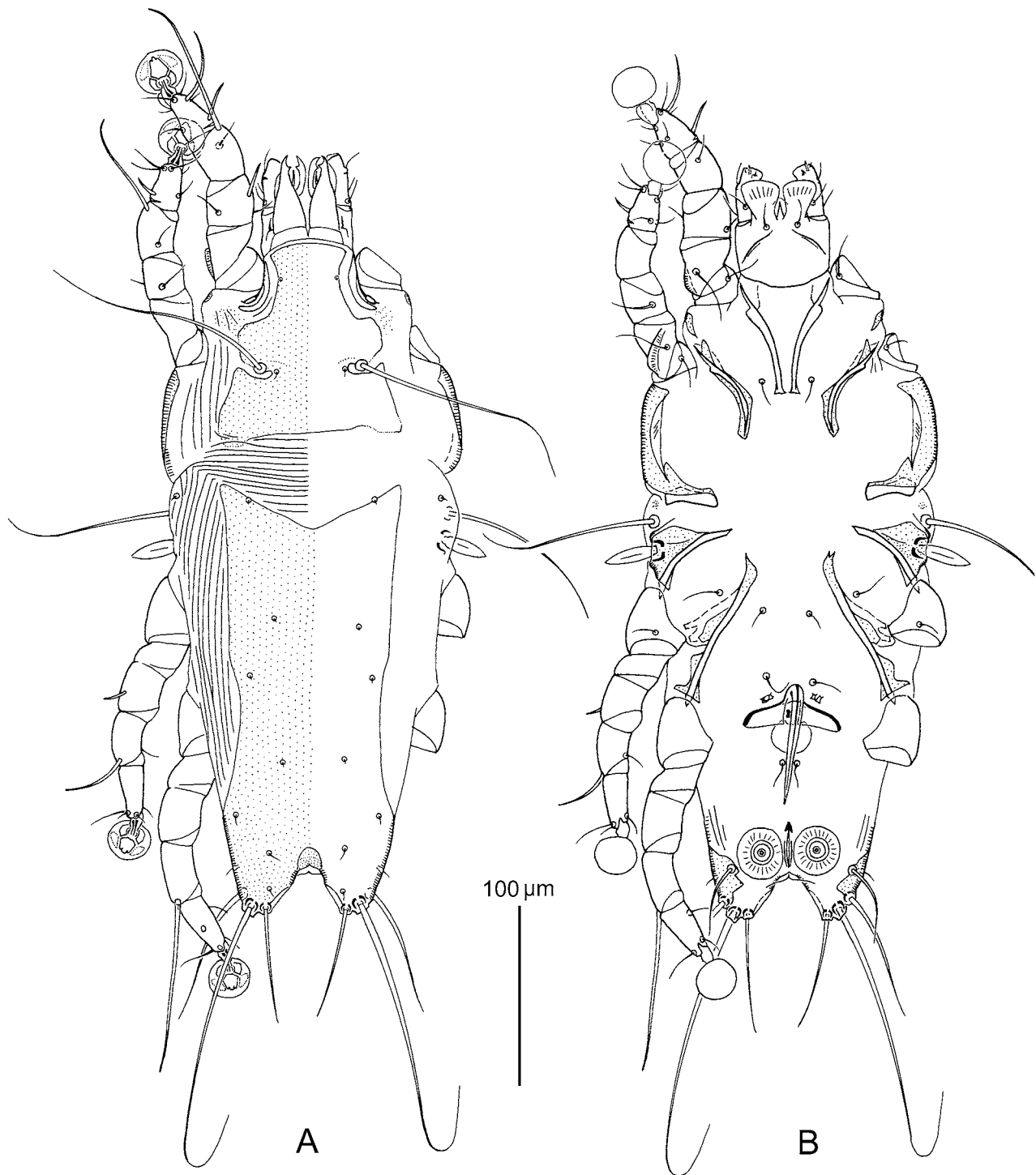
**Male** (holotype, measurements for 6 paratypes in parenthesis). Idiosoma, length × width, 365 (365–385) × 160 (160–170), length of hysterosoma 235 (235–250). Prodorsal shield: 106 (100–110) × 100 (100–115), lateral margins with narrow and deep incisions extending to bases of setae *si*, posterior margin slightly concave,

antero-lateral extensions short and rounded, surface uniformly punctate; scapular setae *se* separated by 55 (55–65) (Fig. 10 A). Setae *ve* present. Setae *cp* situated ventrally on soft tegument. Humeral shields rudimentary (in some specimens absent), situated anterior to bases of setae *cp*. Setae *c2* situated dorso-laterally on soft tegument. Subhumeral setae *c3* lanceolate, 26 (26–28) × 8–9. Hysteronotal shield: greatest length 232 (230–240), width in anterior part 100 (95–108), anterior margin strongly concave, surface uniformly punctate. Distance between prodorsal and hysteronotal shields 53 (50–60). Opisthosomal lobes as long as wide at base; posterior ends of lobes roughly rounded; setae *h2* and *h3* situated on posterior margin of lobes. Terminal cleft as a wide U with divergent branches, 20 (20–22) in length; lateral margins with narrow membrane in posterior half. Supranal concavity present. Setae *f2* situated anterior to bases of setae *ps2*. Setae *h1* situated at level of supranal concavity. Setae *h3* thin setiform, 60 (46–60); setae *ps2* 82 (70–82) long, slightly thickened, with filiform apical part; setae *ps1* minute, filiform, 9 (7–9) long, situated slightly distant from margin of terminal cleft, approximately at level of seta *ps2*. Distance between dorsal setae: *se:c2* 71 (70–78), *c2:d2* 100 (93–100), *d2:e2* 75 (75–93), *e2:h3* 53 (46–55), *d1:d2* 31 (20–33), *e1:e2* 33 (28–46), *h1:ps2* 20 (17–22), *h2:h2* 60 (60–62), *h3:h3* 44 (42–46), *ps2:ps2* 70 (70–72).

Epimerites I free, posterior ends with pair of short and acute extensions (in some specimens epimerites fused in a narrow U with very thin connecting piece) (Fig. 10 B). Coxal fields I, II without large sclerotized areas. Rudimentary sclerite rEpIIa absent. Coxal fields II, III open. Coxal fields IV without sclerotized area at bases of trochanters IV. Epimerites IVa absent. Genital arch of moderate size, 24 (22–24) × 53 (53–57); basal sclerite of genital apparatus with semicircular posterior margin; aedeagus sword-shaped, 64 (64–69) long, not extending to anterior end of anal opening; genital papillae connected by bases. Genital and adanal shields absent. Anal suckers 12 (11–12) in diameter, corolla smooth. Opisthoventral shields occupy outer parts of lobes, posterior end extending to base of setae *ps2*, inner margins bears setae *ps3* slightly posterior to level of anal discs and with blunt extensions at level of anterior end of terminal cleft. Distance between ventral setae: *3b:3a* 9 (7–9), *3a:4a* 42 (42–44), *4a:g* 44 (42–44), *g:ps3* 57 (55–60), *ps3:ps3* 67 (67–78), *ps3:h3* 25 (25–28).

Legs I slightly thicker than legs II, femora I, II with ventral crests, other segments of these legs without processes. Solenidion  $\sigma I$  of genu I short, stick-like, 17 (14–17) long, situated at midlevel of segment; genual seta *cGI*, II, *mGI*, II setiform (Figs 11 A, B). Legs III and IV similar in form and size. Solenidion  $\sigma I$  of genu III in distal part of segment. Seta *d* of tarsus II subequal to corresponding seta *f*, and seta *d* of tarsus III shorter than corresponding seta *f*. Tarsus IV 33 (31–33) long, without apical claw-like process; setae *d*, *e* button-like, seta *d* situated at level of distal one third of segment, seta *e* situated apically; solenidion  $\phi$  of tibia IV approximately 1.5 times longer than tarsus IV including pretarsus (Fig. 11 D).

**Female** (4 paratypes). Idiosoma, length × width, 525–540 × 185–205, length of hysterosoma 355–370. Prodorsal shield: general form as in male except for deep angle-shaped lateral incisions surrounding setae *se*, 115–125 × 130–140, setae *se* separated by 75–80 (Fig. 12 A). Setae *ve* present. Humeral shields rudimentary, situated anterior to bases of setae *se*. Setae *cp* situated on soft tegument. Setae *c2* situated dorso-laterally. Setae *c3* lanceolate, 30–34 × 7–9. Distance between prodorsal and hysteronotal shields 60–70. Anterior and lobar parts of hysteronotal shield completely separated by narrow transverse band of soft tegument. Anterior hysteronotal shield slightly enlarged in anterior part, anterior margin concave, greatest length 254–270, width at anterior margin 130–140, surface uniformly punctate, with pair of pale sclerotized patches of ovate form in posterior angles. Length of lobar region 95–100, greatest width 105–110. Lobar shield almost completely dissected into two pieces by little roughly rectangular incision situated anterior to terminal cleft. Supranal concavity absent. Terminal cleft as a narrow inverted V, 65–68 long, distance between lobar apices 25–35. Setae *h1* on lobar shield, distant from its anterior margins. Setae *h1* and *f2* arranged in low trapezium. Setae *h2* spindle-like, 55–58 × 8–9. Setae *ps1* near to inner margins of opisthosomal lobes. Setae *h3* setiform, 14–22 long, about 1/6 of terminal appendages. Distance between dorsal setae: *se:c2* 92–100, *c2:d2* 115–130, *d2:e2* 130–140, *e2:h2* 55–60, *h2:h3* 40–45, *d1:d2* 25–30, *e1:e2* 45–52, *h1:h2* 25–32, *h1:h1* 40–42, *h2:h2* 75–80, *h3:h3* 42–48.

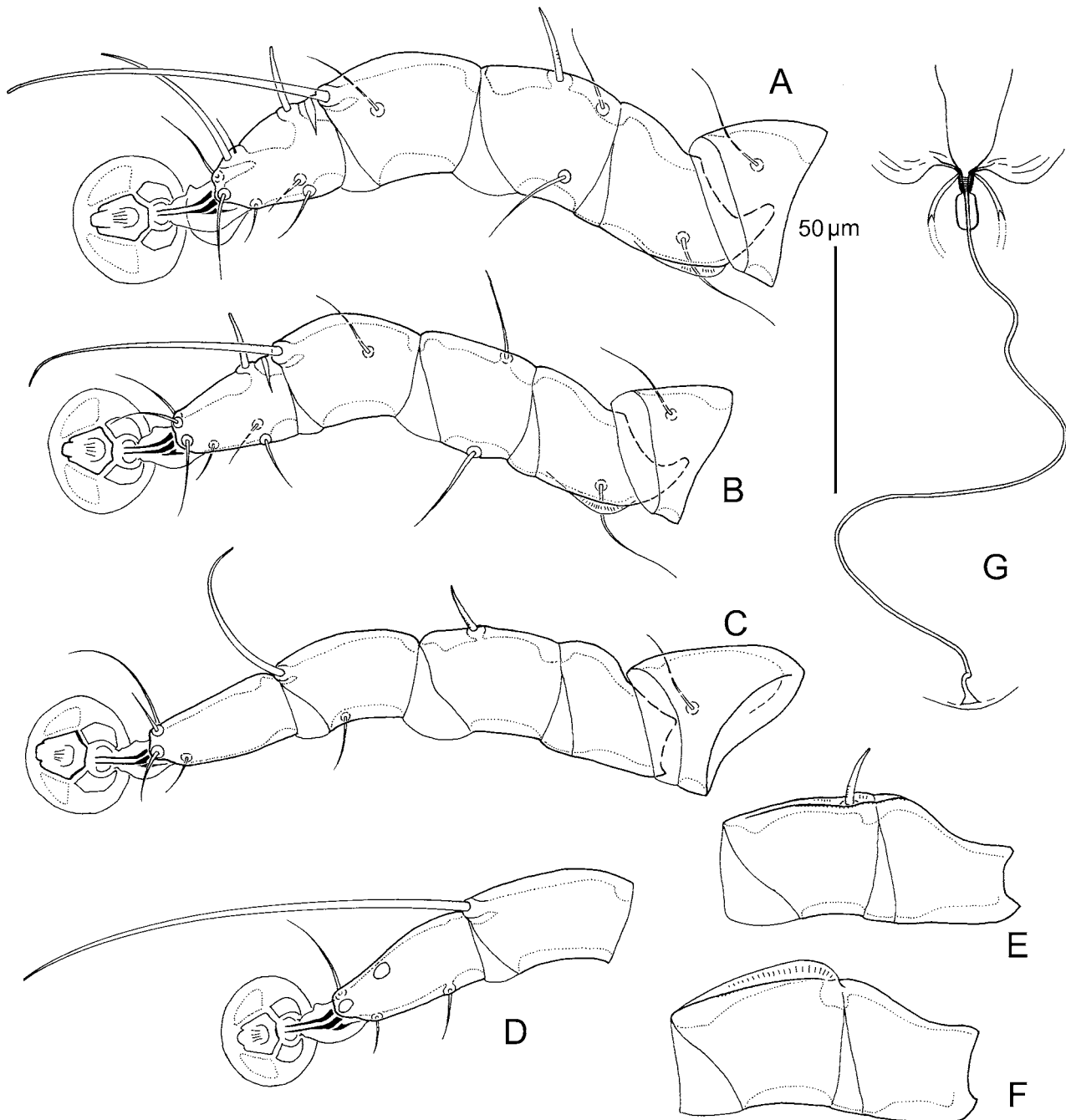


**FIGURE 10.** *Pterodectes pitangi* sp. n., male. A—dorsal view, B—ventral view.

Epimerites I fused as a narrow U, fused part of epimerites with short and acute extension (Fig. 12 B). Lateral parts of coxal fields I, II without large heavy sclerotized areas. Epimerites IVa absent. Translobar apodemes of opisthosomal lobes present, not fused to each other anterior to terminal cleft. Epigynum horseshoe-shaped, with lateral ledge-like extensions, greatest width 75–88. Primary spermaduct with short cylindrical enlargement (7–9 long) near to head of spermatheca; secondary spermaducts, slightly longer than enlargement; copulatory opening ventral, situated posterior to anal opening (Fig. 11 G). Pseudanal setae *ps2*, *ps3* setiform, setae *ps2* situated at level of posterior end of anal opening, distance between setae: *ps2:ps2* 58–64,

ps3:ps3 24–30, ps2:ps3 15–24.

Three distal segments of legs I, II as in male, femur I without ventral crest, femur II with narrow ventral crest. Solenidion  $\sigma 1$  of genu I thin stick-like, 17–22 long. Genual seta *cGI*, II, *mGI*, II setiform. Seta *d* of tarsus II subequal to corresponding seta *f*, and setae *d* of tarsi III, IV shorter than corresponding seta *f*. Genu IV dorsally slightly inflated, with longitudinal crest, genu III without dorsal crest (Figs. 11 E, F).



**FIGURE 11.** *Pterodectes pitangi* sp. n., details. A—leg I of male, B—leg II of male, C—leg III of male, D—tarsus and tibia IV of male, E—femoragenu III of female, F—femoragenu IV of female, G—spermatheca and spermaducts.

**Differential diagnosis.** *Pterodectes pitangi* sp. n. looks most similar to the previous species, *P. molothrus*, by having setiform setae *h3* and lacking lacunae on dorsal shields in males. In both sexes of *P. pitangi*, the prodorsal shield has deep lateral incisions at the level of scapular shields (Figs. 11 A, 13 A), the anterior

margin of hysteronotal shield is distinctly concave, the humeral shields are very little or scarcely distinct rudiments placed anterior to setae *cp*; in males, the aedeagus is relatively short and does not extending to the anal opening, solenidium  $\phi$  of tibia IV is 1.5 times longer than corresponding tarsus and pretarsus (Fig. 11 D); in females, the anterior hysteronotal shield bears only one pair of pale sclerotized patches in posterior angles. In both sexes of *P. molothrus*, the prodorsal shield has no lateral incisions, the anterior margin of hysteronotal shield is straight, the humeral shields are little longitudinal plates situated dorsally regarding to setae *cp*; in males, the aedeagus extends to the anterior end of the anal opening, solenidium  $\phi$  of tibia IV does not extend

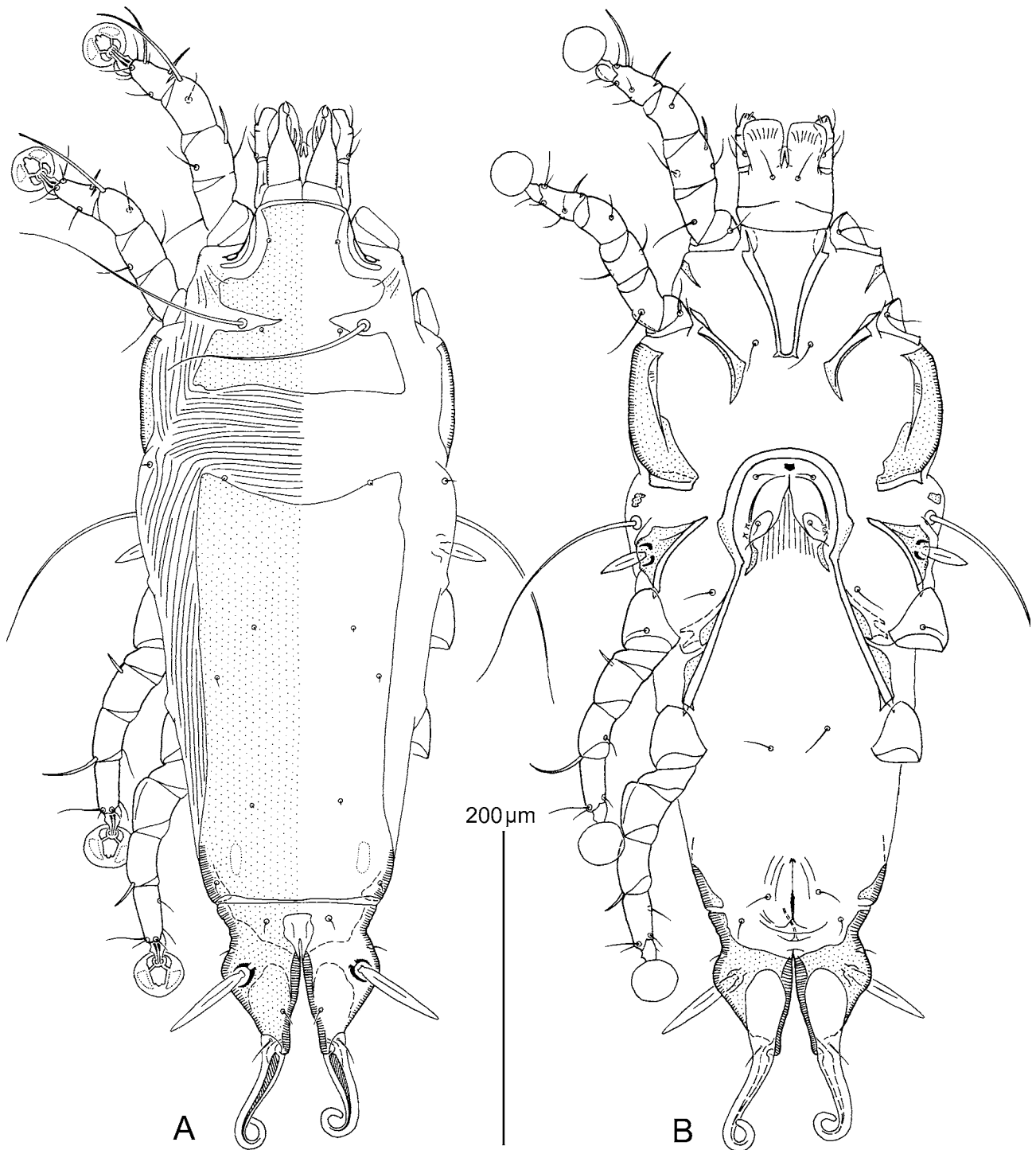


FIGURE 12. *Pterodectes pitangi* sp. n., female. A—dorsal view, B—ventral view.

beyond midlevel of ambulacral disc; in females, the anterior hysteronotal shield bears only 3–4 pairs of pale sclerotized patches along lateral margins and numerous pit-like lacunae in posterior half. Deep lateral incisions in the prodorsal shield and the presence of rudimentary humeral shields in both sexes discriminate *P. pitangi* from other known *Pterodectes* species.

**Etymology.** The specific epithet derives from the generic name of the host and is a noun in the genitive case.

### Genus *Tyrannidectes* Mironov gen. n.

Type species: *Tyrannidectes berlai* Mironov sp. n.

**Both sexes.** Moderately elongated pterodectines. Vertical setae *ve* absent. All hysterosomal setae present. Prodorsal shield covering most of prodorsum, with well developed posterior angles. Scapular shields not developed dorsally. Humeral shields represented by rudimentary plates situated ventrally or absent. Setae *c2* situated laterally or dorso-laterally on striated tegument. Setae *wa* anterior to setae *la* and *ra* on tarsi I, II. Seta *gT* of tibia I in distal half of segment. Setae *cG* and *mG* on genua I, II setiform. Solenidion  $\sigma 1$  of genu I much shorter than solenidion  $\omega 3$  of corresponding tarsus. Femora I, II usually bear ventral crest, other segments of these legs without processes and other modifications. Seta *sR* of trochanters III absent; solenidion  $\sigma 1$  of genu III present. Supranal concavity well developed.

**Male.** Epimerites I fused into a V or narrow U, fused part not connected with epimerites II. Coxal fields II–IV open; epimerites II and IV without extensive sclerotized areas. Opisthosomal lobes moderately elongated, approximately as long as wide, with roughly rounded posterior margin. Terminal cleft as a wide inverted U. Setae *h3* short, narrowly lanceolate, situated on lobar apices. Setae *h1* situated anterior to bases of opisthosomal lobes. Setae *ps1* setiform, minute. Genital arch with well developed branches, situated at level of trochanters IV; aedeagus ensiform, much longer than genital arch. Genital papillae anterior to genital arch. Pregenital apodeme, paragenital apodemes, genital shield and other sclerotized structures around genital apparatus absent. Setae *4a* situated on soft tegument of coxal fields IV. Opisthoventral shields present, narrow. Corolla of anal suckers without indentation; suckers surrounded by membrane with radial striation. Adanal shields absent. Setae *ps3* postero-lateral to anal suckers. Setae *g* and *ps3* in high trapezoid arrangement. Legs I slightly thicker and longer than legs II. Legs III and IV subequal in size. Solenidia  $\phi$  of legs IV longer than on legs III. Tarsus IV without apical claw-like process, setae *d* and *e* button-like.

**Female.** Epimerites I fused into a narrow U. Lobar region of opisthosoma clearly separated from remaining part of opisthosoma; opisthosomal lobes well developed, with long terminal appendages. Hysteronotal shield split dorsally into anterior and lobar shields. Macrosetae *h2* spindle-like. Epigynum horseshoe-shaped, large. Transobar apodemes present. Legs I slightly thicker and longer than legs II. Legs III, IV subequal in size; genu IV dorsally inflated. Solenidia  $\phi$  of tibiae III much longer than on tibiae IV.

**Hosts:** Birds of the family Tyrannidae (Passeriformes).

The genus is monotypic.

**Differential diagnosis.** By most diagnostic features listed above, the new genus is similar to *Pterodectes*, particularly to its species of the *gracilis* group, which are characterized by the position of setae *c2* on humeral shield or dorso-laterally on soft tegument. *Tyrannidectes* clearly differs from *Pterodectes* by the absence of trochanteral seta *sR* on trochanters III (Fig. 14 C).

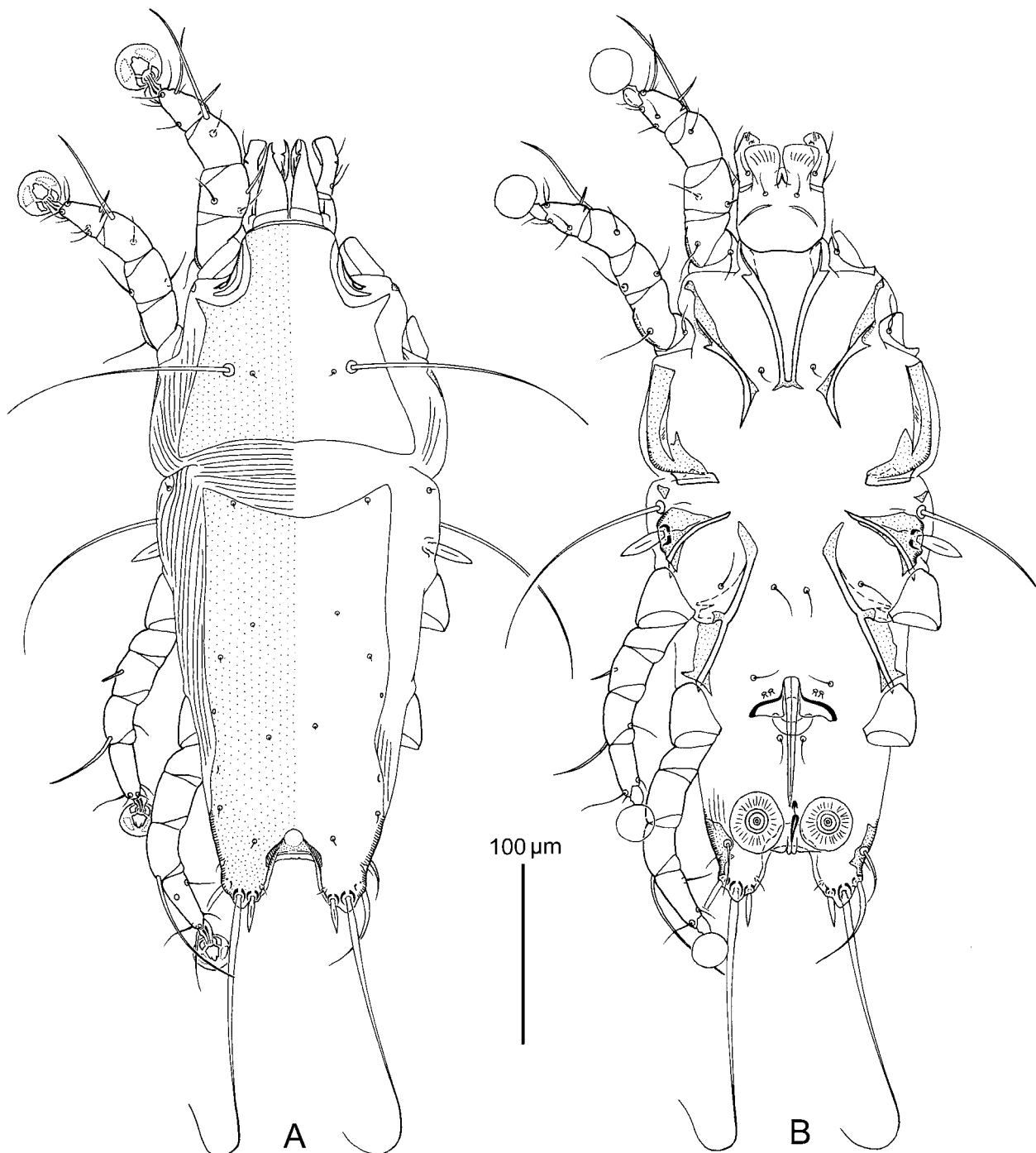
**Etymology.** Contraction of the host family Tyrannidae and *Pterodectes*, masculine.

***Tyrannidectes berlai* Mironov sp. n.**

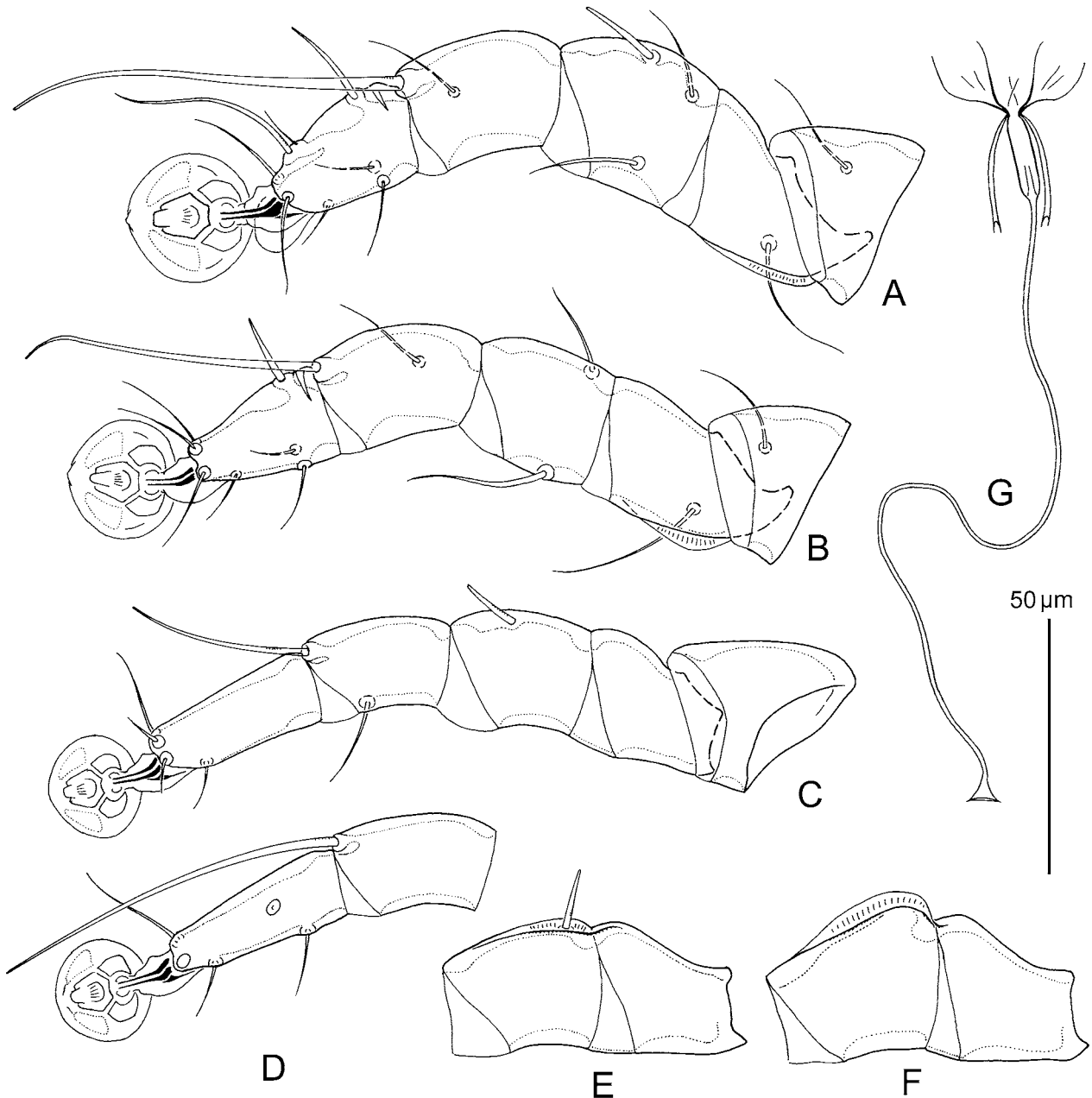
(Figs. 13–15)

Type material. Male holotype (ZISP 4386), 8 male and 3 female paratypes ex *Myiarchus tyrannulus* (Muller, 1776) (Tyrannidae), Brazil, Mato Grosso do Sul, Pantanal, Fazenda Monte Alegre, 21°30'S, 56° 40' W, 20 July 2006, I. Literak and M. Čapek. Holotype, 3 male and 1 female paratypes (ZISP 4386 - 4390) – ZISP, remaining paratypes – PaU.

Additional material. 3 males and 3 females ex *Myiarchus ferox* (Gmelin, 1789), Brazil, Mato Grosso do Sul, Nova Andradina, 22° 15' S, 53° 21' W, 30 July 2006, I. Literak and M. Čapek. 2 males and 2 females (ZISP 4391-4394) – ZISP, remaining specimens – PaU.



**FIGURE 13.** *Tyrannidectes berlai* sp. n., male. A—dorsal view, B—ventral view.

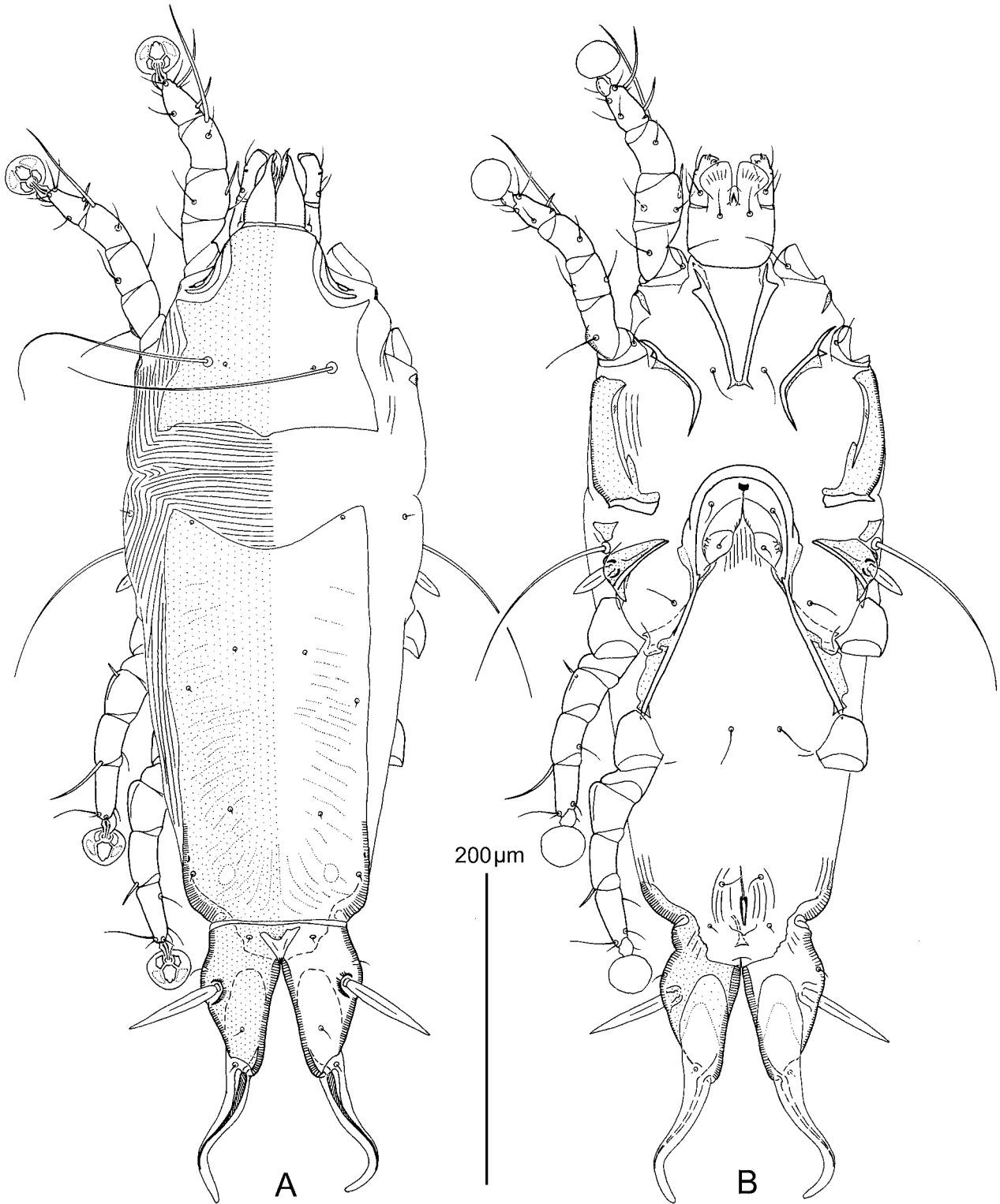


**FIGURE 14.** *Tyrannidectes berlai* sp. n., details. A—leg I of male, B—leg II of male, C—leg III of male, D—tarsus and tibia IV of male, E—femoragenu III of female, F—femoragenu IV of female, G—spermatheca and spermaducts.

**Male** (holotype, measurements for 8 paratypes in parenthesis). Idiosoma, length  $\times$  width, 395 (380–405)  $\times$  168 (165–180), length of hysterosoma 245 (235–245). Prodorsal shield: 128 (104–125)  $\times$  139 (126–135), with lateral margins entire, antero-lateral extensions narrow and acute, posterior margin with pair of wide and shallow concavities; surface uniformly punctate; scapular setae *se* separated by 73 (70–75) (Fig. 13 A). Setae *cp* situated ventrally on soft tegument. Humeral shields rudimentary, situated anterior to bases of setae *cp*. Setae *c2* situated dorsally on soft tegument. Subhumeral setae *c3* lanceolate, 31 (26–33)  $\times$  7 (6–8). Hysteronotal shield: greatest length 240 (230–245), width in anterior part 110 (105–115), anterior margin strongly concave, surface uniformly punctate. Distance between prodorsal and hysteronotal shields 45–65. Opisthosomal lobes as long as wide at base; posterior ends of lobes roughly rounded; setae *h2* and *h3* situated on posterior margin of lobes. Terminal cleft as a wide inverted U with divergent branches, 28 (26–34) in length; lateral margins of cleft with narrow interlobar membranes in distal part. Supranal concavity present. Setae *f2* situated



anterior to bases of setae *ps2*. Setae *h1* situated at level of supranal concavity. Setae *h3* thick setiform, 25 (20–25 long); setae *ps2* with filiform apical part, 50 (48–60) long; setae *ps1* filiform, minute, 7 (7–9) long, situated approximately at midlevel of terminal cleft, slightly distant from its margin. Distance between dorsal setae: *se:c2* 66 (65–82), *c2:d2* 95 (95–100), *d2:e2* 92 (85–96), *e2:h3* 50 (50–55), *d1:d2* 20 (20–25), *e1:e2* 40 (30–40), *h1:ps2* 26 (17–26), *h2:h2* 64 (55–65), *h3:h3* 46 (37–45), *ps2:ps2* 80 (73–80).



**FIGURE 15.** *Tyrannidectes berlai* sp. n., female. A—dorsal view, B—ventral view.

Epimerites I fused as a narrow U, posterior ends of epimerites I with short and acute lateral extensions (Fig. 13 B). Coxal fields I, II without large sclerotized areas; inner margin of epimerites II with short angular extension. Rudimentary sclerite rEpIIa absent. Coxal fields II widely open, coxal III nearly closed. Coxal fields IV without large sclerotized area. Epimerites IVa absent. Genital arch of moderate size, 22 (20–22) × 48 (46–50); basal sclerite of genital apparatus with rounded posterior margin; aedeagus straight, sword-shaped, 78 (72–80) long, extending to anterior end of anal opening; genital papillae present, separated from each other. Genital and adanal shields absent. Anal suckers 12 (11–12) in diameter, corolla smooth. Opisthoventral shields narrow and short, posterior end extending to bases of setae *ps2*, inner margins with setae *ps3* situated slightly posterior to anal suckers and with little tooth at level of lateral setae *f2*. Coxal setae *3a* and *3b* approximately at same transverse level. Distance between ventral setae: *3a:4a* 53 (50–54), *4a:g* 35 (32–36), *g:ps3* 60 (55–60), *ps3:ps3* 82 (73–80), *ps3:h3* 27 (31–33).

Legs I slightly thicker than legs II, femora I, II with narrow ventral crests, other segments of these legs without any processes. Solenidion *σ1* of genu I short, stick-like, 17 (15–18) long, situated at midlevel of segment; seta *cGI*, II, *mGI*, II thin setiform (Figs 14 A, B). Legs III and IV similar in form and size. Solenidion *σ1* of genu III slightly closer to distal part of segment. Seta *d* of tarsus II subequal to corresponding seta *f*, and seta *d* of tarsus III shorter than corresponding seta *f*. Tarsus IV 34 (34–35) long, without apical claw-like process; setae *d*, *e* button-like, seta *d* slightly closer to base of segment, seta *e* at apex of segment; solenidion *φ* of tibia IV extending beyond distal margin of ambulacral disc (Fig. 14 D).

**Female** (3 paratypes). Idiosoma, length × width, 530–585 × 195–220, length of hysterosoma 370–410. Prodorsal shield: general form as in male, 130–135 × 144–158, setae *se* separated by 82–93. Setae *cp* situated on soft tegument. Humeral shields rudimentary, situated anterior to bases of setae *cp*. Setae *c2* situated dorsally on soft tegument. Setae *c3* lanceolate, 28–35 × 7–8.5. Distance between prodorsal and hysteronotal shields 70–95. Anterior and lobar parts of hysteronotal shield dorsally separated by narrow transverse band of soft tegument, but remain connected ventro-laterally by narrow bands (Fig. 15 A, B). Anterior hysteronotal fragment almost parallel-sided, anterior margin concave, greatest length 265–290, width at anterior margin 137–148, surface of shield with numerous transverse striations in lateral parts and with pair of pale sclerotized patches of ovate form in posterior angles. Length of lobar region 95–105, greatest width 100–108. Median area of lobar shield between anterior margin and terminal cleft with triangular unsclerotized patch almost completely dissecting this shield into two pieces. Supranal concavity indistinct. Terminal cleft as a narrow inverted V, 80–98 long, distance between lobar apices 35–42. Setae *h1* on lobar shield, distant from anterior margins. Setae *h1* and *f2* arranged in a low trapezium. Setae *h2* spindle-like, 65–68 × 8–9. Setae *ps1* approximately equidistant from inner and outer margin of opisthosomal lobes. Setae *h3* minute setiform, 5–6 long, about 1/10 of terminal appendages. Distance between dorsal setae: *se:c2* 95–110, *c2:d2* 120–130, *d2:e2* 115–126, *e2:h2* 70–82, *h2:h3* 50–55, *d1:d2* 25–32, *e1:e2* 35–45, *h1:h2* 28–32, *h1:h1* 40–47, *h2:h2* 82–88, *h3:h3* 60–66.

Epimerites I fused into a narrow U with very thin transverse connection, posterior ends of epimerites I with short and acute lateral extension. Lateral parts of coxal fields I, II without heavy sclerotized areas (Fig. 15 B). Epimerites IVa absent. Translobar apodemes of opisthosomal lobes present, not fused to each other anterior to terminal cleft. Epigynum horseshoe-shaped, with short lateral extensions. Head of spermatheca poorly sclerotized, primary spermaduct with short enlargement (about 15 long) near head of spermatheca; secondary spermaducts slightly longer than enlargement of primary spermaduct; copulatory opening situated ventrally, slightly posterior to anal opening (Fig. 14 G). Pseudanal setae *ps2*, *ps3* setiform, setae *ps2* noticeably shorter than *ps3* and situated at level of posterior end of anal opening; distance between setae: *ps2:ps2* 40–50, *ps3:ps3* 25–33, *ps2:ps3* 22–25.

Three distal segments of legs I, II as in male, femur I without ventral crest; femur II with ventral crest. Solenidion *σ1* of genu I thin stick-like, 18–20 long. Genua setae *cGI*, II *mGI*, II setiform. Seta *d* of tarsus II subequal to corresponding seta *f*, and seta *d* of tarsi III, IV shorter than corresponding seta *f*. Genu IV dorsally

inflated, with wide longitudinal dorsal crest, genu III with low longitudinal dorsal crest (Figs. 14, E, F).

**Etymology.** The species is named for Dr. Herbert Franzoni Berla, in recognition of his contribution to the study of feather mites in Brazil.

### Genus *Metapterodectes* Mironov gen. n.

Type species: *Metapterodectes furnarius* Mironov sp. n.

**Both sexes.** Moderately elongated pterodectines. Vertical setae *ve* absent. All hysterosomal setae present. Prodorsal shield covering most part of prodorsum, with well developed posterior angles. Scapular shields narrow. Humeral shields absent. Setae *c2* situated dorso-laterally on striated tegument. Setae *wa* anterior to setae *la* and *ra* on tarsi I, II. Seta *gT* of tibia I in distal half of segment. Setae *cG* and *mG* on genua I, II setiform. Solenidion  $\sigma 1$  of genu I much shorter than solenidion  $\omega 3$  of corresponding tarsus. Femora I, II usually bear ventral crests, other segments of these legs without processes and other modifications. Seta *sR* of trochanters III absent; solenidion  $\sigma 1$  of genu III absent. Supranal concavity present.

**Male.** Epimerites I fused into a narrow U, fused part not connected with epimerites II. Coxal fields II–IV open; epimerites II and IV without extensive sclerotized areas. Opisthosomal lobes moderately elongated, approximately as long as wide, with roughly rounded posterior margin. Terminal cleft as a wide inverted U. Setae *h3* short, narrowly lanceolate, situated on lobar apices. Setae *h1* situated anterior to bases of opisthosomal lobes. Setae *ps1* setiform, minute. Genital arch with well developed branches, situated at level of trochanters IV; aedeagus sword-shaped, much longer than genital arch. Genital papillae anterior to genital arch. Pregenital apodeme, paragenital apodemes, genital shield and other sclerotized structures around genital apparatus absent. Setae *4a* situated on soft tegument of coxal fields IV. Opisthoventral shields present, narrow. Corolla of anal suckers without indentation; suckers surrounded by membrane with radial striation. Adanal shields absent. Setae *ps3* postero-lateral to anal suckers. Setae *g* and *ps3* in high trapezoid arrangement. Legs I slightly thicker and longer than legs II. Legs III and IV subequal in size. Solenidia  $\phi$  of legs III, IV subequal. Tarsus IV without apical claw-like process, setae *d* and *e* button-like.

**Female.** Epimerites I fused into a narrow U. Lobar region of opisthosoma clearly separated from remaining part of opisthosoma; opisthosomal lobes well developed, with long terminal appendages. Hysteronotal shield split dorsally into anterior and lobar shields. Macrosetae *h2* with spindle-like basal part and filiform apical part. Epigynum horseshoe-shaped, large. Translobar apodemes present. Legs I slightly thicker and longer than legs II. Legs III, IV subequal in size; genu IV dorsally inflated. Solenidia  $\phi$  of tibiae III much longer than on tibiae IV.

**Hosts:** Birds of the family Furnariidae (Passeriformes).

The genus is monotypic.

**Differential diagnosis.** By the general appearance and most diagnostic features the genus *Metapterodectes* is similar to the genera *Pterodectes* and *Tyrannidectes*. It differs from both genera by simultaneous loss of seta *sR* and solenidion  $\sigma 1$  on legs III (Fig. 17 C); in *Pterodectes* these structures are always present (Park & Atyeo, 1971), while in *Tyrannidectes*, seta *sR* on trochanter III is absent and solenidion  $\sigma 1$  on genu III is present.

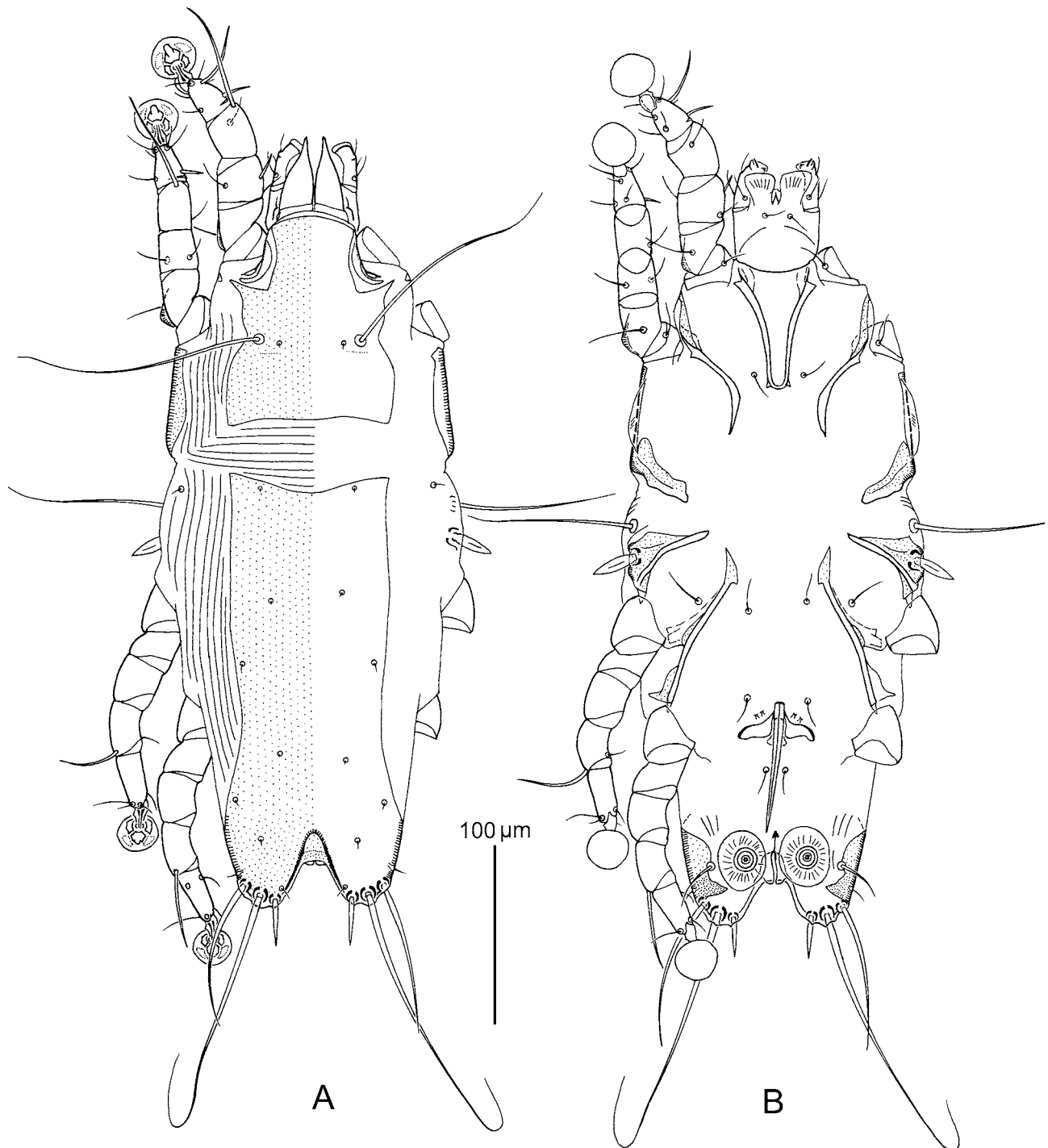
**Etymology.** Contraction of *meta* (advanced in Greek) and *Pterodectes*, masculine.

### *Metapterodectes furnarius* Mironov sp. n.

(Figs. 16–18)

Type material. Male holotype (ZISP 4402), 12 male and 11 female paratypes ex *Furnarius rufus* (Gmelin,

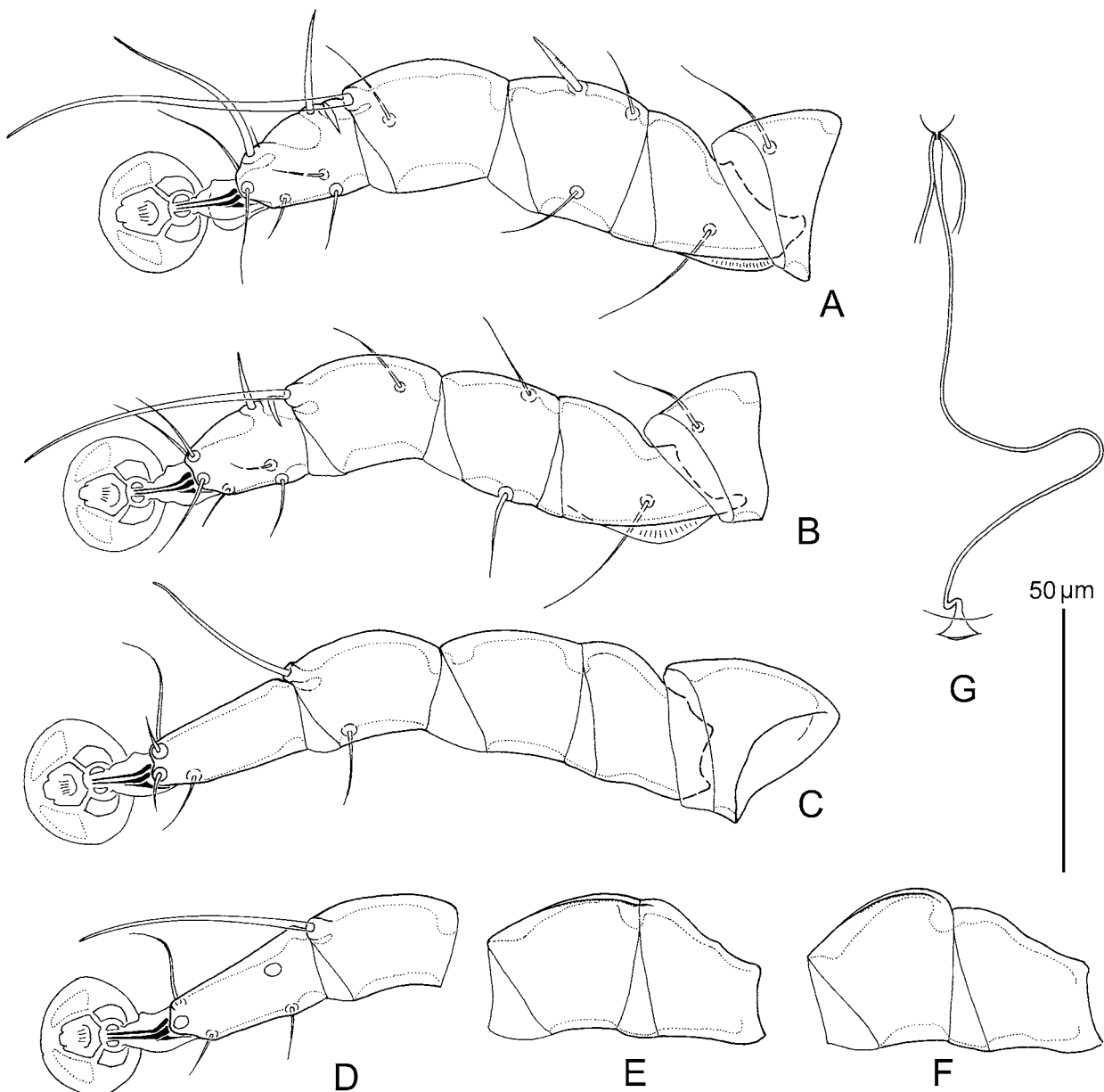
1788) (Furnariidae), Brazil, Pantanal, Fazenda Monte Alegre, 21°30'S, 56° 40' W, 20 July 2006, I. Literak and M. Čapek. Holotype, 6 male and 6 female paratypes (ZISP 4402-4413) – ZISP, remaining paratypes – PaU.



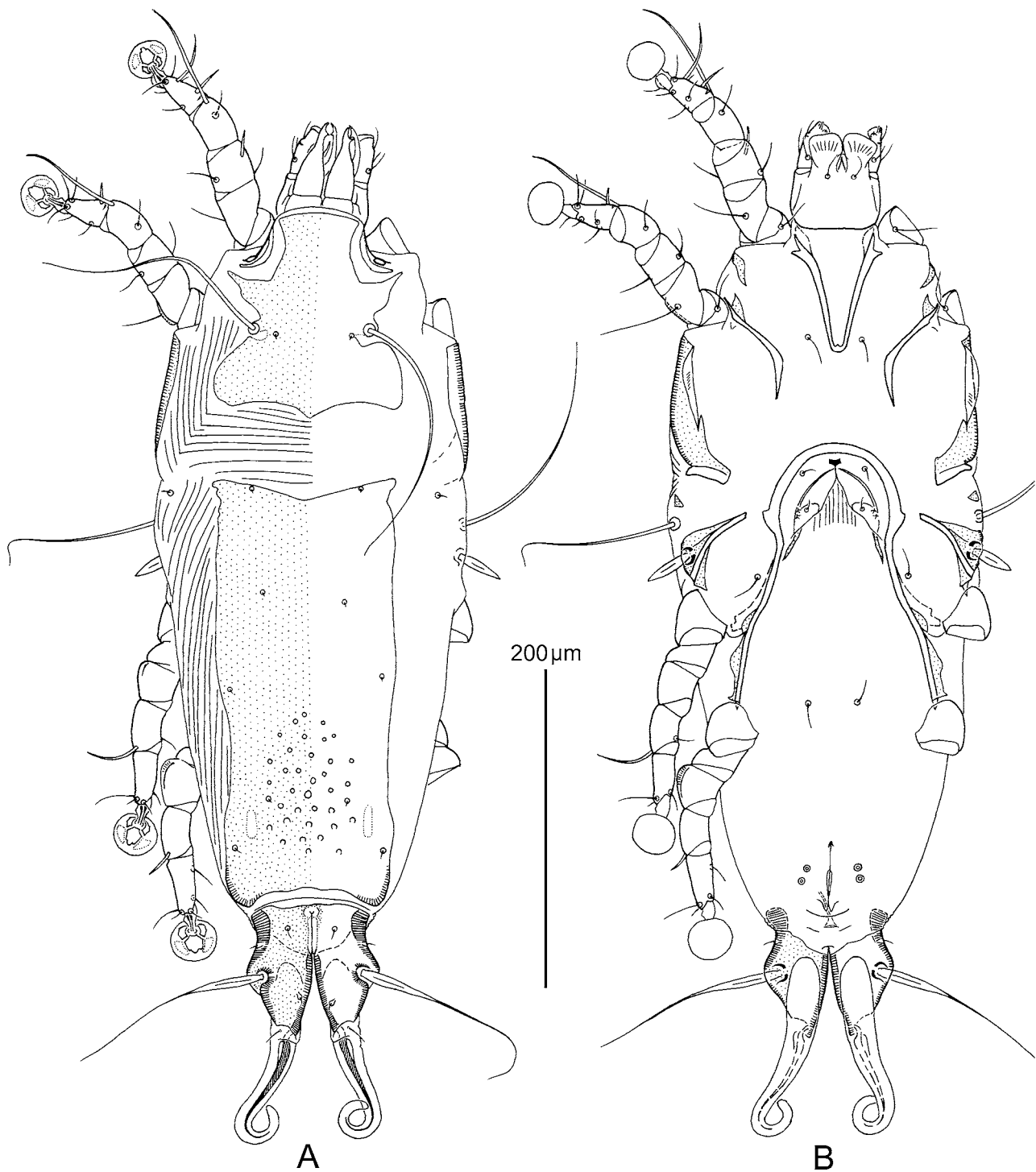
**FIGURE 16.** *Metapterodectes furnarius* sp. n., male. A—dorsal view, B—ventral view.

**Male** (holotype, measurements for 10 paratypes in parenthesis). Idiosoma, length  $\times$  width, 380 (365–380)  $\times$  168 (160–170), length of hysterosoma 235 (230–235). Prodorsal shield: 113 (110–115)  $\times$  95 (92–104), with lateral margins entire, posterior margin slightly sinuous, antero-lateral extensions long and acute, surface uniformly punctate; scapular setae *se* separated by 55 (55–62) (Fig. 16 A). Humeral shields absent. Setae *cp* situated ventrally on soft tegument. Setae *c2* situated dorsally on soft tegument. Subhumeral setae *c3* lanceolate,

26 (24–26) × 7 (6–7). Hysteronotal shield: greatest length 232 (223–235), width of anterior part 88 (80–88), anterior margin slightly concave, surface uniformly punctate. Distance between prodorsal and hysteronotal shields 40 (35–40). Opisthosomal lobes approximately as long as wide at base; posterior margin of lobes roughly rounded, with bases of setae *h3*, *h2* and *ps2*. Supranal concavity present. Terminal cleft as a wide U with divergent branches, 24 (24–26) long. Setae *f2* situated anterior to bases of setae *ps2*. Setae *h1* situated at level of supranal concavity. Setae *h3* narrowly lanceolate, 22 (22–24) × 3 (3); setae *ps2* 73 (68–75) long, slightly thickened, with filiform apex; setae *ps1* minute, filiform, about 5 long, situated on margins of terminal cleft at level of setae *ps2*. Distance between bases of dorsal setae and setal pairs: *se:c2* 82 (70–82), *c2:d2* 97 (90–97), *d2:e2* 77 (66–76), *e2:h3* 45 (45–53), *d1:d2* 38 (33–38), *e1:e2* 24 (15–24), *h1:ps2* 24 (20–26), *h2:h2* 62 (57–62), *h3:h3* 42 (40–42), *ps2:ps2* 80 (75–80).



**FIGURE 17.** *Metapterodectes furnarius* sp. n., details. A—leg I of male, B—leg II of male, C—leg III of male, D—tarsus and tibia IV of male, E—femoragenu III of female, F—femoragenu IV of female, G—spermatheca and spermaducts.



**FIGURE 18.** *Metapterodectes furnarius* sp. n., female. A—dorsal view, B—ventral view.

Epimerites I fused into a narrow U, posterior ends of epimerites I with little tooth-like extensions (Fig. 16 B). Coxal fields I, II without large sclerotized areas. Rudimentary sclerite rEpIIa absent. Coxal fields II, III open. Coxal fields IV without large sclerotized areas at bases of trochanters IV. Epimerites IVa absent. Genital arch of moderate size, 18 (18–24); basal sclerite of genital apparatus small; aedeagus sword-shaped, 75 (68–75) long, extending to anterior end of anal opening; genital papillae connected to each other. Genital and adanal shields absent. Anal suckers 12 (12–13) in diameter, corolla smooth. Opisthoventral shields wide, posterior end extending to bases of setae *ps*<sub>2</sub>; inner margins of these shields with setae *ps*<sub>3</sub> at level of posterior

margins of anal suckers and with acute extension at level of anterior end of terminal cleft. Distance between ventral setae: *3b:3a* 9 (9–11), *3a:4a* 53 (40–53), *4a:g* 40 (33–40), *g:ps3* 55 (48–55), *ps3:ps3* 71 (68–73), *ps3:h3* 31 (30–32).

Legs I slightly thicker than legs II, femora I, II with narrow ventral crests, other segments of these legs without processes. Solenidion  $\sigma I$  of genu I short, stick-like, 12 (12–13) long, situated at midlevel of segment; genual setae *cGI*, II, *mGI*, II setiform (Figs 17 A, B). Seta *d* of tarsus II subequal to corresponding seta *f*, and seta *d* of tarsus III shorter than corresponding seta *f*. Tarsus IV 31 (30–32) long, without apical claw-like process; setae *d*, *e* button-like, seta *d* in proximal half segment, seta *e* at apex of segment; solenidion  $\phi$  of tibia IV extending to midlevel of ambulacral disc (Fig. 17 D).

**Female** (10 paratypes measured). Idiosoma, length  $\times$  width, 520–545  $\times$  195–210, length of hysterosoma 365–380. Prodorsal shield: 125–135  $\times$  120–128, lateral margins with narrow incisions usually extending to bases of setae *si*, posterior margin with pair of shallow concavities separated by blunt-angular extension, antero-lateral extensions long and acute; setae *se* separated by 75 (70–80) (Fig. 18 A). Setae *cp* situated ventrally on soft tegument. Humeral shields rudimentary, situated anterior to bases of setae *cp*. Setae *c2* situated dorso-laterally on soft tegument. Setae *c3* lanceolate, 28–33  $\times$  7–8. Distance between prodorsal and hysteronotal shields 45–55. Anterior and lobar parts of hysteronotal shield completely separated by narrow transverse band of soft tegument. Anterior hysteronotal shield almost parallel-sided, anterior and posterior margins slightly concave, greatest length 265–285, width at anterior margin 115–120, surface with little circular lacunae in posterior half and with pair of pale sclerotized patches slightly anterior to level of setae *e2*. Length of lobar region 90–98, greatest width 85–95. Supranal concavity present. Terminal cleft as a narrow inverted V, 55–62 long, distance between lobar apices 16–24. Setae *h1* on lobar shield, distant from its anterior margins. Setae *h1* and *f2* arranged into low trapezium. Setae *h2* spindle-like basal part enlargement and long filiform apical part, total length of setae 105–120, width of enlarged part 6–7. Setae *ps1* near to inner margins of opisthosomal lobes. Setae *h3* setiform, 9–11 long, about 1/10 of terminal appendages. Distance between dorsal setae: *se:c2* 100–110, *c2:d2* 120–128, *d2:e2* 100–115, *e2:h2* 78–84, *h2:h3* 32–38, *d1:d2* 42–48, *e1:e2* 30–44, *h1:h2* 26–33, *h1:h1* 29–35, *h2:h2* 64–72, *h3:h3* 40–48.

Epimerites I fused as a narrow U, posterior ends of epimerites without lateral extensions (Fig. 18 B). Lateral parts of coxal fields I, II without heavy sclerotized areas. Epimerites IVa absent. Translobar apodemes of opisthosomal lobes present, not fused to each other anterior to terminal cleft. Epigynum horseshoe-shaped, with short ledge-like lateral extensions. Primary spermaduct with scarcely noticeable enlargement near head of spermatheca; secondary spermaducts about 20 long (Fig. 17 G). Pseudanals setae *ps2*, *ps3* modified into little suckers situated approximately at midlevel of anal opening; distance between setae: *ps2:ps2* 35–38, *ps3:ps3* 34–37, *ps2:ps3* 7–9.

Three distal segments of legs I, II as in male; femur I without lateral crest, femur II with ventral crest. Solenidion  $\sigma I$  of genu I thin stick-like, 15–20 long. Genual setae *cGI*, II, *mGI*, II thin setiform. Seta *d* of tarsus II subequal to corresponding seta *f*, and setae *d* of tarsi III, IV shorter than corresponding seta *f*. Genu IV dorsally inflated, genu III, IV with weakly expressed longitudinal dorsal crests (Figs. 17 E, F).

**Etymology.** The specific epithet is taken from the generic name of the host and is a noun in apposition.

### Genus *Nanodectes* Mironov gen. n.

Type species: *Nanodectes formicivorae* Mironov sp. n.

**Both sexes.** Moderately elongated pterodectines. Vertical setae *ve* absent. Hysterosomal setae *d1*, *d2*, *e2*, *f2* absent. Prodorsal shield covering most part of prodorsum, with well developed posterior angles. Scapular shields narrow. Humeral shields present. Setae *c2* situated dorso-laterally on humeral shields. Setae *wa*, *la* and *ra* approximate to each other and situated at midlevel of tarsi I, II. Seta *gT* of tibia I in proximal half of seg-

ment. Setae *cG* and *mG* on genua I, II setiform. Solenidion  $\sigma 1$  of genu I subequal to solenidion  $\omega 3$  on tarsus I. Femora I, II usually bear ventral crests, other segments of these legs without processes and other modifications. Seta *sR* of trochanters III present; solenidion  $\sigma 1$  of genu III present. Supranal concavity present.

**Male.** Epimerites I fused into a narrow V, fused part not connected with epimerites II. Coxal fields II–IV open; epimerites II and IV without extensive sclerotized areas. Opisthosomal lobes roughly angular. Terminal cleft as a wide inverted V; narrow interlobar membrane present. Setae *h3* long setiform, situated on lobar apices. Setae *h1* situated anterior to bases of opisthosomal lobes. Setae *ps1* setiform, minute. Genital arch reduced, represented by sclerotized ring at base of aedeagus, base of genital apparatus at level of trochanters IV; aedeagus sword-shaped. Genital papillae anterior to base of genital apparatus. Pregenital apodeme, paragenital apodemes, genital shield and other sclerotized structures around genital apparatus absent. Setae *4a* situated on soft tegument of coxal fields IV. Opisthoventral shields present, narrow. Corolla of anal suckers with indentation. Adanal shields present, situated antero-lateral to anal suckers. Setae *ps3* situated antero-mesal to anal suckers, noticeably approximate to anal opening. Setae *g* and *ps3* arranged in longitudinal rectangle or inverted narrow trapezium. Legs I slightly thicker than legs II. Legs III and IV subequal in size and form. Solenidia  $\phi$  of legs III, IV subequal. Tarsus IV without apical claw-like process, setae *d* and *e* button-like.

**Female.** Epimerites I fused into a narrow V or U. Lobar region of opisthosoma clearly separated from remaining part of opisthosoma; opisthosomal lobes well developed, with long terminal appendages. Hysteronotal shield split dorsally into anterior and lobar shields. Macrosetae *h2* with spindle-like basal part and filiform apical part. Epigynum horseshoe-shaped, large. Translobar apodemes present. Legs I slightly thicker and longer than legs II. Legs III, IV subequal in size. Solenidia  $\phi$  of tibiae III much longer than on tibiae IV.

**Hosts:** Birds of the family *Thamnophilidae* (Passeriformes).

The genus is monotypic.

**Differential diagnosis.** The genus *Nanodectes* easily differs from all known pterodectine genera by loss of four pairs of hysterosomal setae (*d1*, *d2*, *e2*, *f2*) in both sexes and reduction of genital arch in males. This odd pterodectine genus combines several features of the *Pterodectes* and *Trochilodectes* generic groups. On the one hand, in males of *Nanodectes*, setae *ps3* are situated antero-mesal to the anal suckers and adjacent to the anal opening. This feature occurs in the *Proterothrix* complex (*Proterothrix*, *Neodectes* Park et Atyeo, 1971 and *Megalodectes* Park et Atyeo, 1971) that is quite probably a plesiomorphic state of this character of the subfamily, because this position of setae *ps3* is common for most representatives of the superfamily Analgoidea. On the other hand, in both sexes of *Nanodectes*, setae *wa*, *ra*, *la* are situated at the midlevel of on tarsi I, II, and solenidion  $\sigma 1$  on genua I is subequal in length to solenidion  $\omega 3$  on tarsi I, which are diagnostic features of the *Trochilodectes* group.

**Etymology.** Contraction of *nano* (dwarf, pygmy in Greek) and *Pterodectes*, to point out the relatively small size of these pterodectines, masculine.

### ***Nanodectes formicivora* Mironov sp. n.**

(Figs. 19–21)

Type material. Male holotype (ZISP 4414), 6 male and 10 female paratypes ex *Formicivora rufa* (Wied-Neuwied, 1831) (*Thamnophilidae*), Brazil, Mato Grosso do Sul, Nova Andradina, 22° 15' S, 53° 21' W, 30 July 2006, I. Literak and M. Čapek. Holotype, 3 male and 5 female paratypes (ZISP 4414-4422) – ZISP, rest paratypes – PaU.

**Male** (holotype, measurements for 6 paratypes in parenthesis). Idiosoma, length  $\times$  width, 245 (240–255)  $\times$  113 (108–115), length of hysterosoma 158 (155–162). Prodorsal shield: split into anterior and posterior pieces at level of scapular setae (*se*, *si*), antero-lateral extensions short, posterior margin with short bluntly-



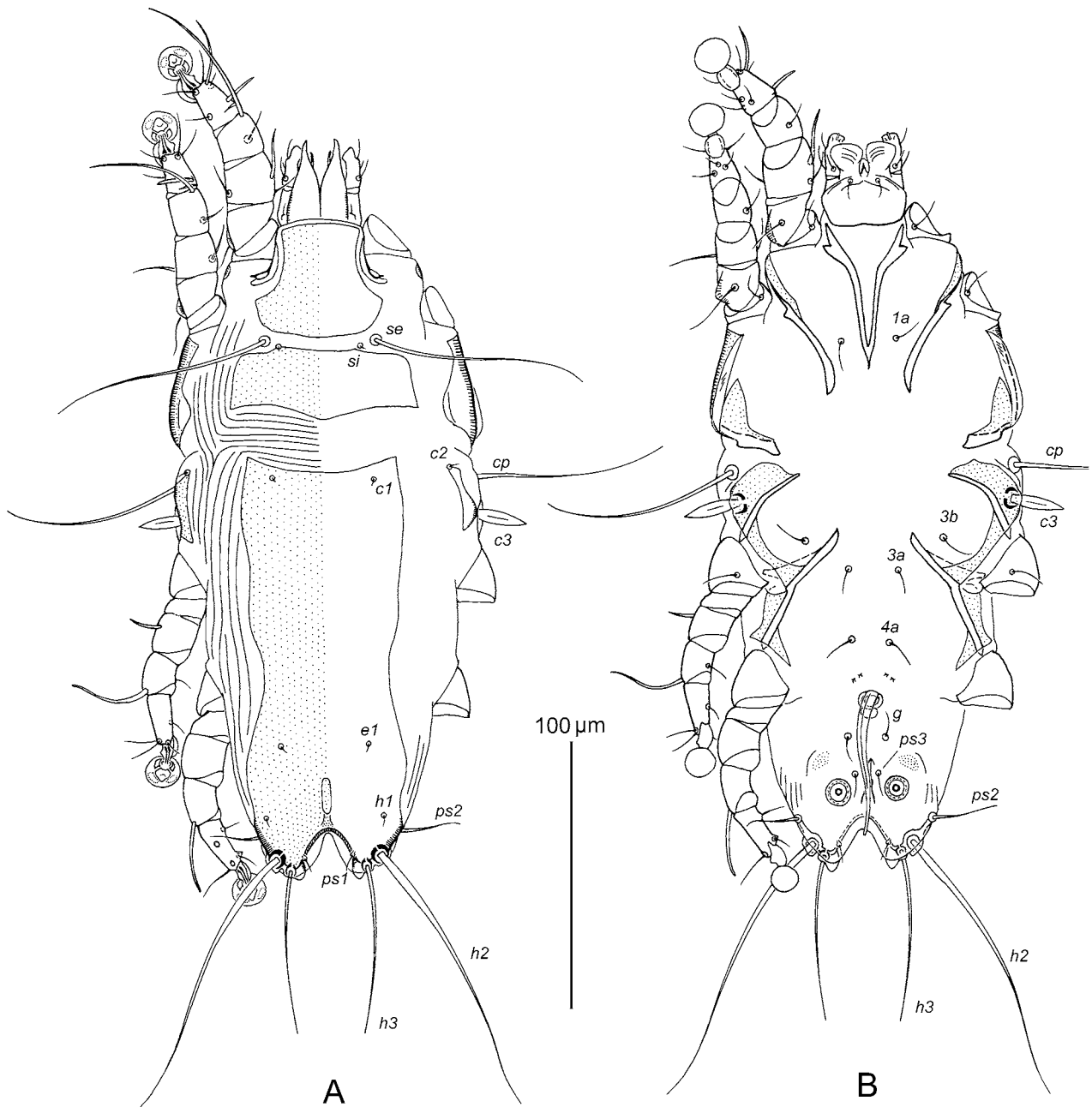
rounded median extension, total length of shield along midline 77 (75–80), width of posterior part 71 (68–75), surface uniformly punctate; scapular setae *se* separated by 42 (40–44) (Fig. 19 A). Inner margins of scapular shields with narrow suprategumental extensions. Humeral shields situated dorso-laterally, narrow. Setae *cp* situated ventrally, on soft tegument. Setae *c2* situated on anterior ends of humeral shields. Subhumeral setae *c3* lanceolate, 20 (19–22) × 4–4.5. Hysteronotal shield: greatest length 155 (150–165), width in anterior part 62 (60–65), anterior margin concave, surface uniformly punctate. Distance between prodorsal and hysteronotal shields 20 (17–22). Opisthosomal lobes roughly angular, short with bases of *h3* on lobar apices. Terminal cleft angle-shaped with widely rounded anterior end, 15 (14–16) in length. Margins of terminal cleft with narrow membranes forming short and rounded extension on lobar apices. Supranal concavity present, narrow. Setae *h1* situated at level of posterior end of supranal concavity. Setae *h3* setiform, 48 (46–52) long; setae *ps2* 18 (15–20) long; setae *ps1* minute, about 3 long, situated on margins of terminal cleft at level of setae *h2*. Distance between dorsal setae: *se:c2* 48 (48–55), *c2:e1* 104 (100–106), *e1:h3* 46 (44–50), *h1:h3* 24 (18–24), *h2:h2* 37 (35–42), *h3:h3* 28 (26–30), *ps2:ps2* 51 (50–53).

Epimerites I fused into a V, fused part with acute median extension (Fig. 19 B). Coxal fields I, II without large sclerotized areas. Rudimentary sclerite rEpIIa absent. Coxal fields II, III open. Coxal fields IV with small angle-shaped sclerotized area at bases of trochanters IV. Epimerites IVa absent. Genital arch strongly reduced, represented by sclerotized ring at base of aedeagus; length of aedeagus, anterior margin of genital ring to apex 50 (48–50), width of ring 9 (9–10). Genital papillae separated, situated slightly anterior to base of genital apparatus. Genital shields absent. Anal suckers 8 (8–9) in diameter, corolla with indentations. Adanal shields of ovate form situated antero-lateral to anal suckers. Opisthoventral shields narrow, represented by narrow bands between bases of setae *ps2* and *h2*, inner margins smooth. Setae *ps3* situated antero-mesal to anal suckers on soft tegument. Distance between ventral setae: *3b:3a* 5 (5–6), *3a:4a* 26 (25–28), *4a:g* 35 (30–35), *g:ps3* 15 (15–17), *ps3:ps3* 9 (9–11), *ps3:h3* 28 (27–33).

Legs I slightly thicker than legs II, femora I, II with narrow ventral crests, other segments without processes. Solenidion  $\sigma 1$  of genu I spiculiform, 20 (20–21) long, slightly shorter than solenidion  $\omega 3$  of corresponding tarsus, situated at midlevel of segment. Genua seta *cGI*, II, *mGI*, II setiform (Figs 20 A, B). Solenidia  $\omega 1$  of tarsi I, II subequal in length, 13 (12–14) long, solenidion  $\omega 1$  of tarsus II noticeably thicker than that of tarsus I. Legs III and IV similar in form and size. Solenidion  $\sigma 1$  of genu III in proximal part of segment. Seta *d* of tarsus II slightly longer than corresponding seta *f*, and seta *d* of tarsus III subequal to corresponding seta *f*. Tarsus IV 22 (22–23) long, with small apico-ventral spine bearing seta *w*; setae *d*, *e* button-like, seta *d* situated dorsally in basal half of segment, seta *e* at apex of segment (Fig. 20 D).

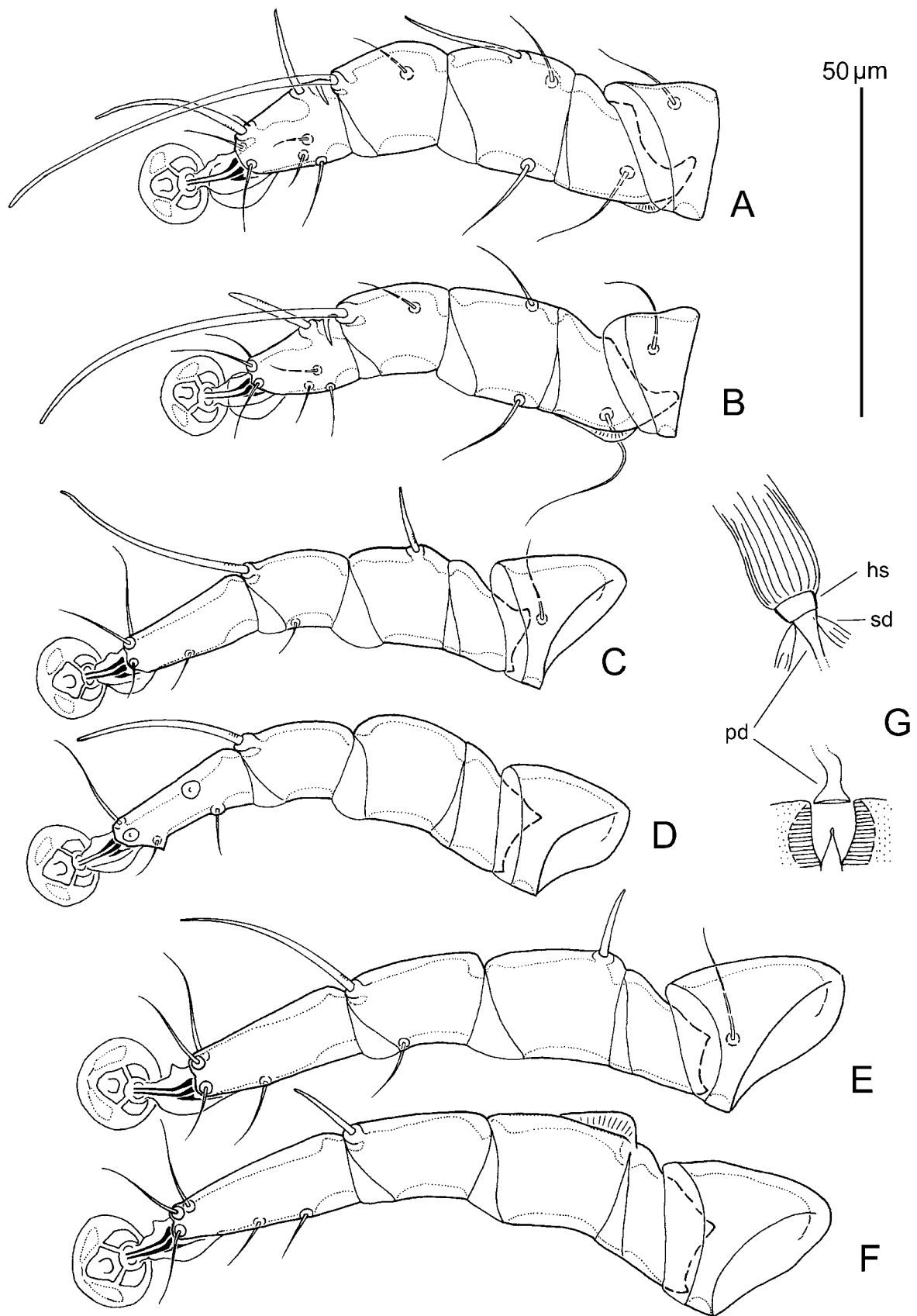
**Female** (10 paratypes). Idiosoma, length × width, 375–392 × 135–150, length of hysterosoma 255–270. Prodorsal shield: entire, 90–96 × 85–95, lateral margins with incision extending to bases of setae *se*, posterior margin with slightly developed median extension, antero-lateral extensions well-developed, rounded apically, setae *se* separated by 60–65. Scapular shields without suprategumental extensions on inner margin. Humeral shields narrow, situated dorso-laterally. Setae *cp* situated on ventral margin of humeral shields. Setae *c2* situated at anterior end of humeral shields. Setae *c3* lanceolate, 22–24 × 4.5–5. Distance between prodorsal and hysteronotal shields 25–30. Anterior and lobar parts of hysteronotal shield completely separated by narrow transverse band of soft tegument (Fig. 21 A). Anterior hysteronotal shield roughly rectangular in form, anterior margin concave, posterior margin with wide and short median extension, greatest length 200–210, width at anterior margin 85–95, surface uniformly punctate. Length of lobar region 58–68, greatest width 75–82. Lobar shield split into halves by narrow median band of soft tegument. Terminal cleft with contour of inverted Y, anterior part parallel-sided, posterior part with diverging margins, 48–54 long, distance between lobar apices 13–18. Setae *h1* on lobar shield, near to its anterior margin. Setae *h2* with spindle-like basal enlargement and filiform apical half, total length 70–75, width of enlarged part 5.5–6. Setae *ps1* close to inner margins of opisthosomal lobes. Setae *h3* thick setiform, 44–52 long, about 2/3 of terminal appendages. Distance between dorsal setae: *se:c2* 64–68, *c2:e1* 145–155, *e1:h2* 64–70, *h2:h3* 35–40, *h1:h2* 15–18, *h1:h1* 55–60, *h2:h2* 62–

Epimerites I fused into a narrow U with very thin connection. Lateral parts of coxal fields I, II without wide sclerotized areas (Fig. 21 B). Epimerites IVa present, angle-shaped. Translobar apodemes of opisthosomal lobes present, not fused to each other anterior to terminal cleft. Epigynum horseshoe-shaped, without lateral extensions. Primary spermaduct slightly enlarged near head of spermatheca, most part of primary spermaduct instinct; secondary spermaducts short and wide, 8–10 long; copulatory opening situated ventrally, between antero-mesal angles of translobar apodemes (Fig. 20 G). Pseudanal setae *ps2*, *ps3* setiform, seta *ps2* situated at level of posterior end of anal opening; distance setae: *ps2:ps2* 35–44, *ps3:ps3* 13–15, *ps2:ps3* 16–18.



**FIGURE 19.** *Nanodectes formicivorae* sp. n., male. A—dorsal view, B—ventral view.

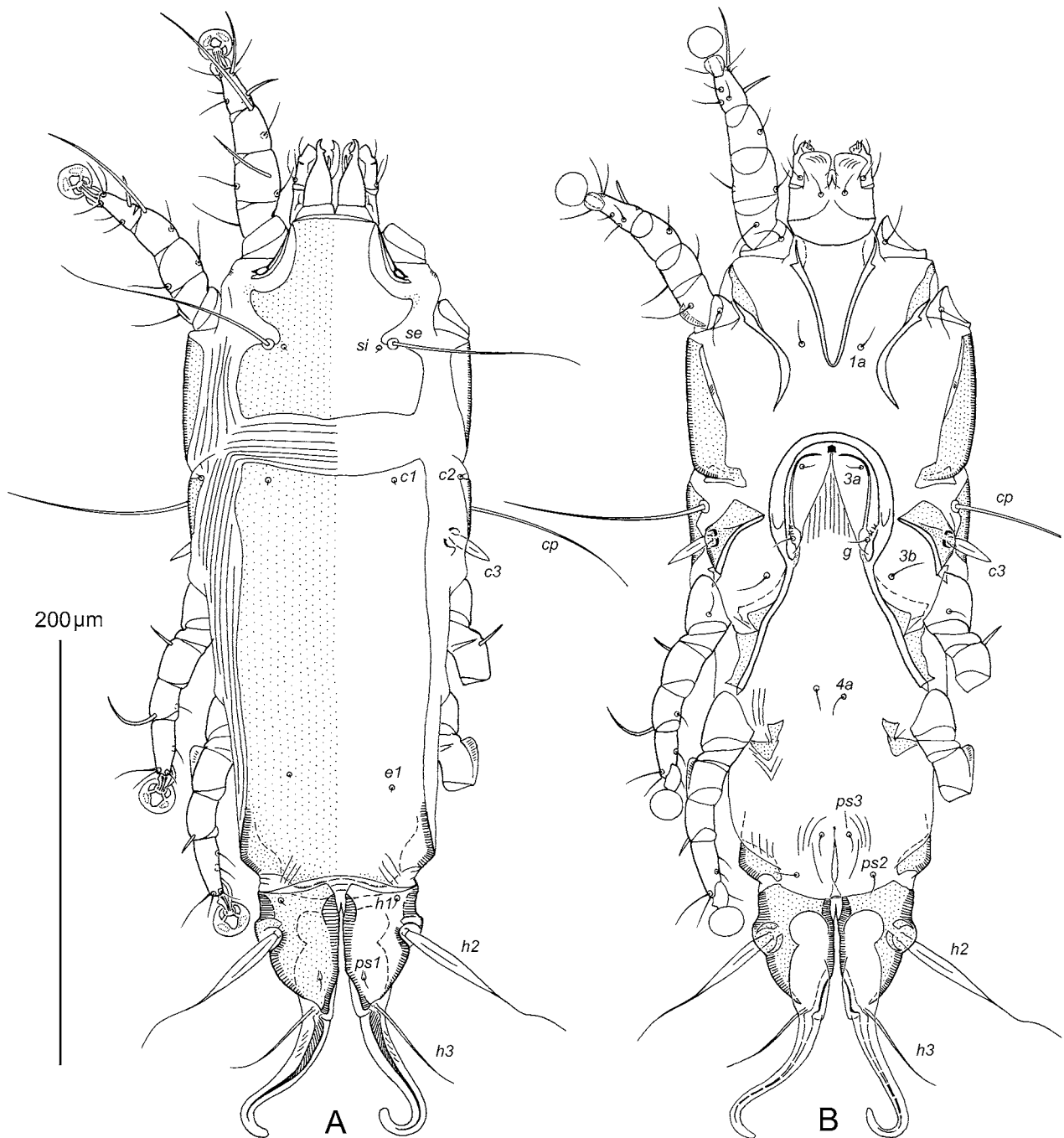
Three distal segments of legs I, II as in male; femur I without ventral crest, femur II with ventral crest. Solenidium  $\sigma 1$  of genu I thin stick-like, length 32–34, slightly longer than solenidium  $\omega 1$  of corresponding tarsus. Genual seta *cGI*, II, *mGI*, II setiform. Solenidia  $\omega 1$  of tarsi I, II subequal in length, 14–16. Seta *d* of tarsus



**FIGURE 20.** *Nanodectes formicivorae* sp. n., details. A—leg I of male, B – leg II of male, C—leg III of male, D—leg IV of male, E—leg III of female, F—leg IV of female, G—spermatheca and spermaducts. hs—head of spermatheca, pd—primary spermaduct, sd—secondary spermaduct.

II slightly longer than corresponding seta *f*, and setae *d* of tarsi III, IV subequal to corresponding seta *f*. Genu IV with longitudinal dorsal crest, genu III not modified (Figs. 20 E, F).

**Etymology.** The specific epithet derives from the generic name of the type host and is a noun in the genitive case.



**FIGURE 21.** *Nanodectes formicivorae* sp. n., female. A—dorsal view, B—ventral view.

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